

United States  
Environmental  
Protection  
Agency

Office of Air Quality Planning and Standards  
Information Transfer and Program Integration Division  
Information Management Group  
Research Triangle Park, NC 27711

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# **AQS User's Guide**

## **Volume AQ2**

### **AQS Data Coding Manual**

**Draft**

VERSION 2.0

Date Revised: May 14, 2004

Note to our users:

If you were familiar with the “old” mainframe system, you should recognize almost all of the old fields and terminology in the “new” system, because the “new” system still addresses the “old” monitoring program data needs.

The Appendices attached to this manual contain codes and descriptions from the various AQS tables. Over time, the list of code values may change, so we will routinely update this manual. Besides using these appendices, the current list of codes and descriptions can also be obtained by using drop-down lists in the AQS Client, or by using the powerful Oracle Discoverer tool.

We plan on making improvements to this manual in the future. And we hope this manual helps make the job of data entry a little more straightforward for you. If you have suggestions or see corrections that should be made, please let us know. Thank you for your cooperation, and your work to protect our Nation’s air quality.

The Information Management Group, OAQPS, USEPA

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**Volume AQ2**  
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**U.S. ENVIRONMENTAL PROTECTION AGENCY  
OFFICE OF AIR QUALITY PLANNING AND STANDARDS  
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RESEARCH TRIANGLE PARK, NC 27711**

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## 1.0 Introduction

This manual explains how to use the Air Quality System (AQS). AQS is a computer-based system for handling the storage and retrieval of information pertaining to airborne pollutants and related meteorological data. It is administered by the U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards (OAQPS) in Research Triangle Park, North Carolina.

Volume AQ1 contains the AQS data dictionary. This volume, AQ2, describes coding of air quality (AQ) data transactions.

This volume describes the various transactions used to create, update, or delete data in the Air Quality System. It is intended for those individuals who are responsible for maintaining the air quality data for their organizations.

The remainder of this volume is organized as follows:

Section 2 - Overview of Data Coding and Validation

Section 3 - Common Fields

Section 4 - Site Transactions (AA, AB, AC)

Section 5 - Monitor Transactions (MA, MB, MC, MD, ME, MF, MG, MH, MI, MJ, MK)

Section 6 - Raw Data Transactions (RC, RD)

Section 7 - Precision, Accuracy Transactions (RA, RP)

Section 8 - Annual Summary Data (RS)

Section 9 - Blanks Data (RB)

---

## 2.0 Overview of Data Coding and Validation

The Air Quality System contains data from a variety of organizations, including state and local agencies, tribes, and federal organizations. It includes descriptions of air monitoring sites and monitoring equipment, measured concentrations of air pollutants and related parameters, and calculated summary and statistical information. This is called air quality (AQ) data throughout the rest of this volume.

Reporting agencies submit AQ data as formatted transactions by first uploading the transaction file(s) to EPA's Central Data Exchange (CDX). Files loaded to CDX are then available to AQS for the batch load process. (Note that online data entry via data screens is also available, in addition to using the batch process.) The user then employs AQS software to process the data through five steps of batch loading, starting with file loading to AQS and ending with posting the data to the database. Internet Explorer (a Web browser) is used to access both CDX and AQS applications.

### 2.1 AQS Transactions

Twenty types of transactions are used to provide data and control information for updating the AQS database. Detailed instructions for coding individual transactions are presented in Chapters 3 through 9. The transaction formats are available for downloading from the AQS website, along with code tables. The AQS website address is:

[www.epa.gov/TTN/airs/airsaqs](http://www.epa.gov/TTN/airs/airsaqs)

### 2.2 General Coding Instructions

AQS transaction formats make use of field delimiters, rather than column position, to determine which field is to be processed. The delimiter character is the vertical bar “|”. Transactions, therefore, always start with the two-character transaction type, followed by the delimiter character, followed by the one-character action code (I, U, or D), followed by the delimiter character, followed by the next field (state), etc. If non-key fields are to be ignored, then the delimiters are included directly following the last value supplied (no spaces). Missing delimiters at the end of the transaction record are treated as null fields, i.e. the missing delimiters are assumed to be there by the batch update software.

The legacy (mainframe) transaction formats are still supported for Raw Composite (RC), Raw Hourly, Daily and Sub-Hourly (RD), Raw Precision (RP), and Raw Accuracy (RA), with the exception of non-key field deletions using asterisks. The legacy transaction formats are column-specified and no delimiters are used. Legacy transaction formats are all fixed at 80 characters in length.

Four general types of values are used to code air quality transactions: codes, dates, numeric data, and alphanumeric data.

### **2.2.1 Codes**

Codes must be entered on transactions exactly as they are stored in the AQS tables. For example, a county code is three digits, and you must code all three digits of the code, including any leading zeros. The instructions for fields that take a code value include the term "code" in the list of field attributes. Code values are available from the TTN web pages. The larger tables of code values are also available as drop-down lists in the AQS Client software.

### **2.2.2 Dates**

Dates are entered in YYYY, or YYYYMMDD format. YYYY is year, MM is month number, DD is day number. The instructions for fields that take a date value include the term "date" in the list of field attributes.

### **2.2.3 Numeric Values**

The instructions for fields that take a numeric value include the term "numeric" in the list of field attributes. The convention for number of digits and decimal places in this manual is: total number of digits, followed by a comma, followed by the number of decimal places. For example, 10,5 is a ten-digit number including five decimal places (nnnnn.nnnnn).

### **2.2.4 Alphanumeric Values**

The instructions for these fields include the term "character" in the list of field attributes. The length of allowable text is specified for each field. Many alphanumeric fields are validated against reference tables in AQS. For these fields, the values entered must match exactly the values on the appropriate reference tables.

### **2.2.5 Mandatory Fields**

Certain fields are mandatory (required), and they must have a value on the transaction. Some fields are always mandatory; other fields are mandatory only under certain conditions. For example, action code is always mandatory; it must be coded on every transaction. The coding instructions in subsequent chapters identify fields as Mandatory or Optional, and specify the conditions when a value is mandatory on the transaction. Also, the batch transaction formats contain notes showing various dependencies and required fields.



### **2.2.6 Key Fields**

Certain mandatory fields are also labeled as “Key” fields. These fields are used to uniquely identify specific data in the database. For example, for a Monitor Sampling Period, the Date Sampling Began, is a key field. It, along with {state, county, site, parameter, and POC} uniquely identify one row of data in the database. Key fields are always mandatory for all action codes, and key fields cannot be modified by an update transaction.

### **2.2.7 Deletion of Non-Key Field Values Using Batch Transactions**

The deletion of non-key field values (without deleting the entire record) is no longer supported in the batch transaction mode. The use of asterisks in field values to signify field deletion is no longer supported. The AQS client now has an online maintain function which will allow interactive deletion of a single field.

### **2.2.8 Transaction Dependencies**

More than one transaction type may be required to insert (add) new data to the database. The transactions required will vary according to the type of data being inserted. Sometimes the value of a field may require an additional transaction. The transaction dependencies for the transactions needed to insert sites and monitors are shown in Appendix QQ.

---

## 3.0 Common Fields

The AQS transaction formats contain certain fields in common. These common fields are described in this chapter.

### 3.1 Transaction Type

**Description:** Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

**Attributes:**           Alphanumeric  
                          2-character code  
                          Mandatory

**Coding Instructions:** Place a valid transaction type in the first delimited field.  
Valid transaction types are:  
AA, AB, AC for site transactions  
MA, MB, MC, MD, ME, MF, MG, MH, MI, MJ, MK for monitor transactions  
RC, RD for raw data transactions (composite and hourly, daily, sub-hourly)  
RA and RP for audit transactions  
RS for annual summary data  
RB for Blanks Transactions

**Business Rules:**

Common Rules

1. Transaction Type is mandatory

**Error Messages:**

1. Transaction Type is required.
2. Transaction Type must be in TRANSACTION\_TYPES table in database.

**Error Messages:**

1. Invalid Transaction Type.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 3.2 Action Code

**Description:** Indicates the data manipulation action to be performed by the transaction.

**Attributes:** Alphanumeric  
1-character code  
Mandatory

**Coding Instructions:** Place the values I, U, or D in the second delimited field.  
I - Insert a new row into the appropriate table in the database.  
U - Change one or more column values for an existing row in one or more tables.  
D - Delete a row from a table(s) for the row containing the key data.

#### Business Rules

##### Common Rules

1. Action Code is required.  
**Error Messages:**
  1. Action Code is Required.
2. Action Code must be either 'I', 'U', or 'D'..  
**Error Messages:**
  1. Invalid Action Code.

##### Insert Rules

None.

##### Update Rules

None.

##### Delete Rules

None.

Transaction Type	Action Code	Database Processing
AA-AC	I	Insert a new site into the Site Table.
	U	Change one or more column values within a site-related table row.
AA	D	Delete a site from the Site Table (not allowed once raw data has been loaded for any monitor at the site).
MA-MK	I	Insert a new monitor into the Site Table.
	U	Change or delete one or more column values within a Monitor related table row .
MA	D	Delete a monitor from the Monitors Table (not allowed once raw data has been loaded for the monitor).

Transaction Type	Action Code	Database Processing
RC, RD	I	Insert new values into the Raw Data Table.
	U	Change or delete existing values in the Raw Data Table.
	D	Delete existing values from the Raw Data Table.
RP	I	Insert precision data for collected samples.
	U	Change existing precision value(s).
	D	Delete existing precision values for a specified time interval.
RA	I	Insert a new accuracy value in the Accuracy Data Table for a specified time interval.
	U	Change an existing accuracy value in the Accuracy Data Table.
	D	Delete existing accuracy values for a specified time interval from the Accuracy Data Table.
RS	I	Insert summary data for a pollutant for a year (when no corresponding raw data exists).
	U	Change existing summary values.
	D	Delete existing summary values.

### 3.3 State Code

**Description:** A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

**Attributes:** Alphanumeric  
2-digit code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid FIPS state code in delimited field 3. A code is valid if it exists in the States Table.

#### Business Rules

##### Common Rules:

1. State Code is mandatory.

##### Error Messages:

1. State Code is required.

Insert Rules:

1. (State Code, County Code, City Code) must be in COUNTY\_CITIES table.

**Error Messages:**

1. Integrity constraint (AIRSRAQS.SI\_CC\_FK) violated<sup>1</sup>
2. Invalid State-County

2. (State Code, County Code, City Code) must be at production status.

**Error Messages:**

1. Status for CN\_STT\_STATE\_CODE, CN\_COUNTY\_CODE, CI\_STT\_STATE\_CODE, CI\_CITY\_CODE is inactive

Update Rules:

1. (State Code, County Code, Site ID) must be in the SITES table.

**Error Messages:**

1. Unable to update or delete site.
2. No data found.

Delete Rules:

1. (State Code, County Code, Site ID) must be in the SITES table.

**Error Messages:**

1. Unable to update or delete site.
2. No data found.

### 3.4 County Code

**Description:** A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

**Attributes:** Alphanumeric  
3-digit code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid county code in the fourth delimited field. A code is valid if it exists in combination with state code and city code, in the County Cities Table

---

<sup>1</sup>This is an Oracle Error. Whenever Oracle errors are generated, a second “user friendly” message is also generated to explain the first.

**Business Rules****Common Rules:**

1. County Code is required.

**Error Messages:**

1. County Code is required.

**Insert Rules:**

1. (State Code, County Code, City Code) must be in COUNTY\_CITIES table.

**Error Messages:**

1. Integrity constraint (AIRSRAQS.SI\_CC\_FK) violated<sup>1</sup>
2. Invalid State-County

2. (State Code, County Code, City Code) must be at production status.

**Error Messages:**

1. Status for CN\_STT\_STATE\_CODE, CN\_COUNTY\_CODE, CI\_STT\_STATE\_CODE, CI\_CITY\_CODE is inactive.

**Update Rules:**

1. (State Code, County Code, Site ID) must be in the SITES table.

**Error Messages:**

1. Unable to update or delete site.
2. No data found.

**Delete Rules:**

1. (State Code, County Code, Site ID) must be in the SITES table.

**Error Messages:**

1. Unable to update or delete site.
2. No data found.

### 3.5 Site ID

**Description:**

A numeric identifier (ID) that uniquely identifies each air monitoring site within a county. There is no requirement that site IDs be assigned continuously or in any particular order. Local organizations are thus free to allocate site numbers in any way they chose as long as there is no duplication within a county.

A specific site ID is associated with a specific physical location and address. Any change in address requires a new site ID to be assigned. This address change could include a change from the roof of one building to another. A change in location on the same roof should not normally require a new site ID. Although an address change would

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<sup>1</sup>This is an Oracle Error. Whenever Oracle errors are generated, a second "user friendly" message is also generated to explain the first.

routinely mean a new site ID, some changes that do not change the site's location in respect to surrounding sources and its measurement scale, would require no change. An EPA Regional Office should be consulted for assistance in determining whether a new site ID is required.

If a new site ID is needed for a site not operated by the air pollution control agency, that agency should be contacted to assist in the ID assignment, to ensure that the ID is unique within the county. In other words, when a new site ID is assigned, it must be different from any other site ID already existing for that combination of state ID and county code.

**Attributes:**           Alphanumeric  
                          4-digit ID  
                          Mandatory  
                          Key Field

**Coding Instructions:** Place a four-digit numeric code in the fifth delimited field. For update and delete, a site ID value is valid if it exists in combination with state code and county code in the Sites Table.

### **Business Rules**

#### Common Rules:

1.     Site ID is mandatory.  
      **Error Messages:**
  1.     Site ID is required.
2.     Site ID must be exactly 4 digits.  
      **Error Messages:**
  1.     Invalid Site ID length

#### Insert Rules:

None.

#### Update Rules:

1.     (State Code, County Code, Site ID) must be in the SITES table.  
      **Error Messages:**
  1.     Unable to update or delete site.
  2.     No data found.

#### Delete Rules:

1.     (State Code, County Code, Site ID) must be in the SITES table.  
      **Error Messages:**
  1.     Unable to update or delete site.
  2.     No data found.





---

## 4.0 Site Transactions (AA, AB, AC)

This set of three transactions is used to update Site information.

Type AA, Basic Site Information, performs data manipulation on the Sites and Agency Roles Tables, and contains site information in the following fields:

Transaction Type	Date Site Established
Action Code	Date Site Terminated
State Code	ZIP Code
County Code	Congressional District
Site ID	Block
Latitude	Block Group
Longitude	Census Tract
UTM Zone	Class I Area
UTM Easting	Local Region
UTM Northing	Local Site Name
LDP Method of Collection	HQ Evaluation Date
LDP Horizontal Datum	Regional Evaluation Date
LDP Source Scale	Compass Sector
LDP Measurement Accuracy Value	Distance to City
LDP Vertical Measure	Type Meteorological Site
Time Zone	Meteorological Site ID
Support Agency	Distance to Meteorological Site
Street Address	Direction to Meteorological Site
City Code	State or Local ID
Urban Area Code	LDP Vertical Method
AQCR	LDP Vertical Datum
Land Use	LDP Vertical Accuracy Value
Location Setting	

Type AB, Site Street Information, performs data manipulation on the Tangent Roads Table, and contains site information in the following fields:

Transaction Type	Street Name
Action Code	Type Road
State Code	Traffic Count
County Code	Year of Traffic Count
Site ID	Direction to Street
Tangent Street Number	Source of Traffic Count

Type AC, Site Open Path Information, performs data manipulation on the Open Paths Table, and contains site information in the following fields:

Transaction Type	Beam Length
Action Code	Height of Transmitter
State Code	Height of Receiver
County Code	Minimum Height
Site ID	Maximum Height
Open Path Number	Land Use Under Path
Direction to Transmitter	

Insert transactions (i.e., transactions with action code I) are used to create new site-related data. When creating a new site, only one type AA is allowed, while multiple AB and AC transactions can be entered. Each AB transaction supplies information for one street surrounding a site. Each AC transaction supplies information for one open path monitor at a site.

Update transactions (i.e., transactions with action code U) are used to change the contents of site-specific fields. Blank fields on an update transaction are ignored; they do not affect fields in the database. The values coded on an update transaction replace the values of the corresponding columns in the database. If no value existed previously, the value from the transaction is inserted into the corresponding column and row. Only non-key fields can be updated.

Delete transactions (i.e., transactions with action code D) are used to remove site-related information. Note: A site may not be deleted if any raw data has been loaded for any monitor at the site..

Legacy transactions are not supported for site data.

See the Transaction Requirements Table in the Appendices to see which data input transactions are required to create sites. Also, the data input transaction formats are included as an appendix.

---

## 4.1 Basic Site Information - Transaction Type AA

The state, county, and site fields are always validated, as described in Section 3 above; other fields will be validated if supplied for Update transactions, but not for Delete transactions.

See the transaction requirements in the Appendices for a list of transactions required to create sites and monitors.

See the data input transaction formats in the Appendices for a list of required fields on each transaction format.

### 4.1.1 Transaction Type

**Description:** Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

**Attributes:**           Alphanumeric  
                              2-character code  
                              Mandatory

**Coding Instructions:** Place AA in the first delimited field.

#### **Business Rules:**

##### Common Rules

1. Transaction Type is mandatory

##### **Error Messages:**

1. Transaction Type is Required.
2. Transaction Type must be in TRANSACTION\_TYPES table in database.

##### **Error Messages:**

1. Invalid Transaction Type.

##### Insert Rules

None.

##### Update Rules

None.

##### Delete Rules

None.

### 4.1.2 Action Code

**Description:** Indicates the data manipulation action to be performed by the transaction.

**Attributes:**           Alphanumeric  
                          1-character code  
                          Mandatory

**Coding Instructions:** Place the values I, U, or D in the second delimited field.  
I - Insert a new row into the appropriate table in the database.  
U - Change one or more column values for an existing row in one or more tables.  
D - Delete a row from a table(s) for the row containing the key data.

### **Business Rules**

#### Common Rules

1.     Action Code is required.  
      **Error Messages:**
  1.     Action Code is Required.
2.     Action Code must be either 'I', 'U', or 'D'..  
      **Error Messages:**
  1.     Invalid Action Code.

#### Insert Rules

None.

#### Update Rules

None.

#### Delete Rules

None.

### **4.1.3 State Code**

**Description:**       A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

**Attributes:**       Alphanumeric  
                          2-character code  
                          Mandatory  
                          Key Field

**Coding Instructions:** Place a valid FIPS state code in delimited field 3. A code is valid if it exists in the States Table.

### **Business Rules**

#### Common Rules:

1.     State Code is mandatory.  
      **Error Messages:**

1. State Code is required.

**Insert Rules:**

1. (State Code, County Code, City Code) must be in COUNTY\_CITIES table.

**Error Messages:**

1. Integrity constraint (AIRSRAQS.SI\_CC\_FK) violated<sup>1</sup>
2. Invalid State-County

2. A Site with (State Code, County Code, Site ID) must not already be in the database.

**Error Messages:**

1. Unique constraint (AIRSRAQS.SI\_UK) violated
2. Unable to insert Site.

3. (State Code, County Code, City Code) must be at production status.

**Error Messages:**

1. Status for CN\_STT\_STATE\_CODE, CN\_COUNTY\_CODE, CI\_STT\_STATE\_CODE, CI\_CITY\_CODE is inactive

**Update Rules:**

1. (State Code, County Code, Site ID) must be in the SITES table.

**Error Messages:**

1. Unable to update or delete site.
2. No data found.

**Delete Rules:**

1. (State Code, County Code, Site ID) must be in the SITES table.

**Error Messages:**

1. Unable to update or delete site.
2. No data found.

#### 4.1.4 County Code

**Description:**

A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

**Attributes:**

Alphanumeric  
3-digit code  
Mandatory  
Key Field

---

<sup>1</sup>This is an Oracle Error. Whenever Oracle errors are generated, a second “user friendly” message is also generated to explain the first.

**Coding Instructions:** Place a valid county code in the fourth delimited field. A code is valid if it exists in combination with state code and city code, in the County Cities Table.

**Business Rules**Common Rules:

1. County Code is required.

**Error Messages:**

1. County Code is required.

Insert Rules:

1. (State Code, County Code, City Code) must be in COUNTY\_CITIES table.

**Error Messages:**

1. Integrity constraint (AIRSRAQS.SI\_CC\_FK) violated<sup>1</sup>
2. Invalid State-County

2. A Site with (State Code, County Code, Site ID) must not already be in the database.

**Error Messages:**

1. Unable to insert Site.
2. Unique constraint (AIRSRAQS.SI\_UK) violated

3. (State Code, County Code, City Code) must be at production status.

**Error Messages:**

1. Status for CN\_STT\_STATE\_CODE, CN\_COUNTY\_CODE, CI\_STT\_STATE\_CODE, CI\_CITY\_CODE is inactive.

Update Rules:

1. (State Code, County Code, Site ID) must be in the SITES table.

**Error Messages:**

1. Unable to update or delete site.
2. No data found.

Delete Rules:

1. (State Code, County Code, Site ID) must be in the SITES table.

**Error Messages:**

1. Unable to update or delete site.
2. No data found.

---

<sup>1</sup>This is an Oracle Error. Whenever Oracle errors are generated, a second “user friendly” message is also generated to explain the first.

### 4.1.5 Site ID

**Description:**

A numeric identifier (ID) that uniquely identifies each air monitoring site within a county. There is no requirement that site IDs be assigned continuously or in any particular order. Local organizations are thus free to allocate site numbers in any way they chose as long as there is no duplication within a county.

A specific site ID is associated with a specific physical location and address. Any change in address requires a new site ID to be assigned. This address change could include a change from the roof of one building to another. A change in location on the same roof should not normally require a new site ID. Although an address change would routinely mean a new site ID, some changes that do not change the site's location in respect to surrounding sources and its measurement scale, would require no change. An EPA Regional Office should be consulted for assistance in determining whether a new site ID is required.

If a new site ID is needed for a site not operated by the air pollution control agency, that agency should be contacted to assist in the ID assignment, to ensure that the ID is unique within the county. In other words, when a new site ID is assigned, it must be different from any other site ID already existing for that combination of state and county code.

**Attributes:**

Alphanumeric  
4-digit ID  
Mandatory  
Key Field

**Coding Instructions:**

Place a four-digit numeric code in the fifth delimited field. For update and delete, a site ID value is valid if it exists in combination with state code and county code in the Sites Table.

**Business Rules**Common Rules:

1. Site ID is mandatory.

**Error Messages:**

1. Site ID is required.

Insert Rules:

1. A Site with (State Code, County Code, Site ID) must not already be in the database.

**Error Messages:**

1. Unable to insert Site.
  2. Unique constraint (AIRSRAQS.SI\_UK) violated
2. Site ID must be exactly 4 digits.

**Error Messages:**

1. Invalid Site ID length

**Update Rules:**

1. (State Code, County Code, Site ID) must be in the SITES table.

**Error Messages:**

1. Unable to update or delete site.
2. No data found.

**Delete Rules:**

1. (State Code, County Code, Site ID) must be in the SITES table.

**Error Messages:**

1. Unable to update or delete site.
2. No data found.

### 4.1.6 Latitude

**Description:**

The monitoring site's angular distance north or south of the equator measured in decimal degrees. The associated sign specifies the direction of measurement, a positive number indicating north and negative indicating south. EPA Locational Data Policy (LDP) requires that coordinates be provided for all sites. More information regarding EPA's data standards and policies may be found on EPA's Environmental Data Registry (EDR) Website (<http://www.epa.gov/edr/>).

**Attributes:**

Numeric  
14 digits, including 6 decimal places (nnnnnnnn.nnnnnn)  
Optional<sup>2</sup>

**Coding Instructions:**

A site's coordinates must be given either as latitude/longitude or universal transverse Mercator (UTM) coordinates, but not both. (When latitude is provided on the transaction, longitude must also be provided, but UTM values must not be provided.) When latitude and longitude are provided on the transaction, the UTM coordinates are system-generated during the load step for the Sites Table (for insert and update action codes). Therefore, all Sites Table rows contain both latitude/longitude and UTM coordinates.

To insert or update, place a latitude value, in decimal degrees, in the sixth delimited field. For a coordinate above the equator, enter the value as a positive number. For a coordinate below the equator, enter the value as a negative number.

---

<sup>2</sup>It is mandatory that either Lat/Long be provided or UTM.



**Business Rules****Common Rules:**

1. Latitude must be between the Min and Max Latitudes for the County

**Error Messages:**

1. Site Latitude or Longitude are not within the county.

**Insert Rules**

1. Either (Latitude, Longitude) or (UTM Zone, UTM Easting, UTM Northing) combinations must be provided, but not both.

**Error Messages:**

1. Either Lat-Long or UTM information must be provided

**Update Rules**

None.

**Delete Rules**

None.

**4.1.7 Longitude****Description:**

The monitoring site's angular distance east or west of the prime meridian at Greenwich, measured in decimal degrees. The associated sign specifies the direction of measurement, a positive number indicating east and negative indicating west. EPA Locational Data Policy requires that coordinates be provided for all sites. More information regarding EPA's data standards and policies may be found on EPA's Environmental Data Registry (EDR) Website (<http://www.epa.gov/edr/>).

**Attributes:**

Numeric  
15 digits, including 6 decimal places (nnnnnnnnnn.nnnnnn)  
Optional<sup>2</sup>

**Coding Instructions:**

A site's coordinates must be given either as latitude/longitude or UTM coordinates, but not both. (When longitude is provided on the transaction, latitude must also be provided, but UTM values must not be provided.) When latitude and longitude are provided on the transaction, the UTM coordinates are system-generated during the load step for the Sites Table (for insert and update action codes). Therefore, all Sites Table rows contain both latitude/longitude and UTM coordinates.

To insert or update, place a longitude value, in decimal degrees, in the seventh delimited field. For a coordinate west of the prime meridian, enter the value as a positive number. For a coordinate east of the prime meridian, enter the value as a negative number.

---

<sup>2</sup>It is mandatory that either Lat/Long be provided or UTM.

**Business Rules**Common Rules:

1. Longitude must be between the Min and Max Longitudes for the County

**Error Messages:**

1. Site Latitude or Longitude are not within the county.

Insert Rules

1. Either (Latitude, Longitude) or (UTM Zone, UTM Easting, UTM Northing) combinations must be provided, but not both.

**Error Messages:**

1. Either Lat-Long or UTM information must be provided

Update Rules

None.

Delete Rules

None.

**4.1.8 UTM Zone****Description:**

The zone of the universal transverse Mercator (UTM) system in which a site is located. EPA Locational Data Policy requires that coordinates be provided for all sites. AQS will convert the UTM coordinates to latitude/longitude, and store both UTM and latitude/longitude. More information regarding EPA's data standards and policies may be found on EPA's Environmental Data Registry (EDR) Website (<http://www.epa.gov/edr/>).

**Attributes:**

Numeric  
12 digits (nnnnnnnnnnnnnn)  
Optional<sup>2</sup>

**Coding Instructions:**

A site's coordinates must be given either as latitude/longitude or UTM coordinates, but not both. (When UTM zone is provided on the transaction, UTM easting and UTM northing must also be provided, but latitude/longitude values must not be provided.) When UTM coordinates are provided on the transaction, latitude and longitude are system-generated for the Sites Table during the load step (for insert and update action codes). Therefore, all Sites Table rows contain both latitude/longitude and UTM coordinates.

To insert or update, place a UTM zone value in the eighth delimited field.

---

<sup>2</sup>It is mandatory that either Lat/Long be provided or UTM.

**Business Rules****Common Rules:**

1. Site location must be between the Min and Max Latitude-Longitude for the County

**Error Messages:**

1. Site Latitude or Longitude are not within the county.

**Insert Rules**

1. Either (Latitude, Longitude) or (UTM Zone, UTM Easting, UTM Northing) combinations must be provided, but not both.

**Error Messages:**

1. Either Lat-Long or UTM information must be provided

**Update Rules**

None.

**Delete Rules**

None.

**4.1.9 UTM Easting****Description:**

The easting UTM coordinate, expressed in meters (i.e., the horizontal distance from the reference edge of the UTM zone) for the site. EPA Locational Data Policy requires that coordinates be provided for all sites. AQS will convert the UTM coordinates to latitude/longitude, and store both UTM and latitude/longitude. More information regarding EPA's data standards and policies may be found on EPA's Environmental Data Registry (EDR) Website (<http://www.epa.gov/edr/>).

**Attributes:**

Numeric  
10 digits, including 2 decimal places (nnnnnnnn.nn)  
Optional<sup>2</sup>

**Coding Instructions:**

A site's coordinates must be given either as latitude/longitude or UTM coordinates, but not both. (When UTM easting is provided on the transaction, UTM zone and UTM northing must also be provided, but latitude/longitude values must not be provided.) When UTM coordinates are provided on the transaction, latitude and longitude are system-generated for the Sites Table during the load step (for insert and update action codes). Therefore, all Sites Table rows contain both latitude/longitude and UTM coordinates.

To insert or update, place a UTM easting value in the ninth delimited field.

---

<sup>2</sup>It is mandatory that either Lat/Long be provided or UTM.

**Business Rules**Common Rules:

1. Site location must be between the Min and Max Latitude-Longitude for the County

**Error Messages:**

1. Site Latitude or Longitude are not within the county.

Insert Rules

1. Either (Latitude, Longitude) or (UTM Zone, UTM Easting, UTM Northing) combinations must be provided, but not both.

**Error Messages:**

1. Either Lat-Long or UTM information must be provided

Update Rules

None.

Delete Rules

None.

**4.1.10 UTM Northing****Description:**

The northing UTM coordinate expressed in meters (i.e., for the Northern hemisphere, the vertical distance from the equator; for the Southern hemisphere, 10,000,000 minus the vertical distance from the equator) for the site. EPA Locational Data Policy requires that coordinates be provided for all sites. AQS will convert the UTM coordinates to latitude/longitude, and store both UTM and latitude/longitude. More information regarding EPA's data standards and policies may be found on EPA's Environmental Data Registry (EDR) Website (<http://www.epa.gov/edr/>).

**Attributes:**

Numeric  
10 digits, including 2 decimal places (nnnnnnnn.nn)  
Optional<sup>2</sup>

**Coding Instructions:**

A site's coordinates must be given either as latitude/longitude or UTM coordinates, but not both. (When UTM northing is provided on the transaction, UTM zone and UTM easting must also be provided, but latitude/longitude values must not be provided.) When UTM coordinates are provided on the transaction, latitude and longitude are system-generated for the Sites Table during the load step (for insert and update action codes). Therefore, all Sites Table rows contain both latitude/longitude and UTM coordinates.

To insert or update, place a UTM northing value in the tenth delimited

---

<sup>2</sup>It is mandatory that either Lat/Long be provided or UTM.

field.

## Business Rules

### Common Rules:

1. Site location must be between the Min and Max Latitude-Longitude for the County

#### Error Messages:

1. Site Latitude or Longitude are not within the county.

### Insert Rules

1. Either (Latitude, Longitude) or (UTM Zone, UTM Easting, UTM Northing) combinations must be provided, but not both.

#### Error Messages:

1. Either Lat-Long or UTM information must be provided

### Update Rules

None.

### Delete Rules

None.

## 4.1.11 LDP Method of Collection

**Description:** Method used to determine the latitude/longitude or UTM coordinates. Required by EPA Locational Data Policy (LDP). More information regarding EPA's data standards and policies may be found on EPA's Environmental Data Registry (EDR) Website (<http://www.epa.gov/edr/>).

**Attributes:** Alphanumeric  
3-digit code (nnn)  
Mandatory (for Insert)

**Coding Instructions:** Place a valid LDP method of collection code in the eleventh delimited field. A code is valid if it is in the LDP Collection Methods Table. View code descriptions in the Appendices, or via Discoverer, and choose the appropriate code. Examples of code values for this data element are given below.

LDP Method Of Collection Codes as of September 11, 2003 are:

Code	Description
001	ADDRESS MATCHING-HOUSE NUMBER
002	ADDRESS MATCHING-BLOCK FACE
003	ADDRESS MATCHING-STREET CENTERLINE
004	ADDRESS MATCHING-NEAREST INTERSECTION
005	ADDRESS MATCHING-PRIMARY NAME
006	ADDRESS MATCHING-DIGITIZED
007	ADDRESS MATCHING-OTHER
008	CENSUS BLOCK-1990-CENTROID

009	CENSUS BLOCK/GROUP-1990-CENTROID
010	CENSUS BLOCK/TRACT-1990-CENTROID
011	CENSUS-OTHER
012	GPS CARRIER PHASE STATIC RELATIVE POSITION
013	GPS CARRIER PHASE KINEMATIC RELATIVE POSITION
014	GPS CODE (PSEUDO RANGE) DIFFERENTIAL
015	GPS CODE (PSEUDO RANGE) PRECISE POSITION
016	GPS CODE (PSEUDO RANGE) STANDARD POSITION (SA OFF)
017	GPS CODE (PSEUDO RANGE) STANDARD POSITION (SA ON)
018	INTERPOLATION-MAP
019	INTERPOLATION-PHOTO
020	INTERPOLATION-SATELLITE
021	INTERPOLATION-OTHER
022	LORAN C
023	PUBLIC-LAND-SURVEY-QUARTER SECTION
024	PUBLIC-LAND-SURVEY-FOOTING
025	CLASSICAL SURVEYING TECHNIQUES
026	ZIP CODE-CENTROID
027	UNKNOWN
028	GPS - UNSPECIFIED
029	GPS - WITH CANADIAN ACTIVE CONTROL SYSTEM
030	INTERPOLATION - DIGITAL MAP SRCE (TIGER)
031	INTERPOLATION - SPOT
032	INTERPOLATION-MSS
033	INTERPOLATION-TM
034	PUBLIC LAND SURVEY - EIGHTH SECTION
035	PUBLIC LAND SURVEY - SIXTEENTH SECTION
036	PUBLIC LAND SURVEY - FOOTING
037	ZIP+4 CENTROID
038	ZIP+2 CENTROID

## Business Rules

### Common Rules:

1. LDP Method of Collection must be in LDP\_COLLECTION\_METHODS table.

#### **Error Messages:**

1. Integrity constraint (AIRSRAQS.SI\_LDPCM\_FK) violated
2. LDP Method of Collection must be at production status.

#### **Error Messages:**

1. Status for LDP\_COLL\_METHOD\_CODE is inactive

Insert Rules

1. LDP Method of Collection is mandatory.

**Error Messages:**

1. Cannot insert NULL into  
("AIRSRAQS"."SITES"."LPDCM\_LDP\_COLL\_METHOD\_CODE")

Update Rules

None.

Delete Rules

None.

#### 4.1.12 LDP Horizontal Datum

**Description:**

The edition of North American Datum used as the basis for determining the site coordinates. (The editions of North American Datum establish a network of monuments and reference points defining a mathematical surface from which geographic computations can be made.) The World Geodetic Survey 1984 (WGS84) is one horizontal datum used by many Global Positioning System (GPS) instruments. United States Geological Survey (USGS) maps often use the North Atlantic Datum 1927 (NAD27).

This data element is required by EPA Locational Data Policy. More information regarding EPA's data standards and policies may be found on EPA's Environmental Data Registry (EDR) Website (<http://www.epa.gov/edr/>).

**Attributes:**

Alphanumeric  
Up to 120 characters  
Mandatory (for Insert)

**Coding Instructions:**

Place a valid LDP horizontal datum value in the twelfth delimited field. A value is valid if it is in the LDP Horizontal Data Table. Examples of LDP Horizontal Datum values as of September 11, 2003 are given below:

<u>Horiz Datum</u>	<u>Status Ind</u>
NAD27	P
NAD83	P
NAD84	I
UNKNOWN	I
WGS84	P

Note: A status indicator of I means that old data could have these values, but new data cannot use these values. (I = inactive, P = production)

**Business Rules**Common Rules:

1. LDP Horizontal Datum must be in LDP\_HORIZONTAL\_DATA table.  
**Error Messages:**
  1. Integrity constraint (AIRSRAQS.SI\_LDPHD\_FK) violated.
2. LDP\_HORIZONTAL\_DATA (LDP\_HORIZ\_DATUM) must be at production status.  
**Error Messages:**
  1. Status for LDP\_HORIZ\_DATUM is inactive.

Insert Rules

1. LDP Horizontal Datum is mandatory.  
**Error Messages:**
  1. Cannot insert NULL into  
("AIRSRAQS"."SITES"."LDPHD\_LDP\_HORIZ\_DATUM")

Update Rules

None.

Delete Rules

None.

**4.1.13 LDP Source Scale**

**Description:** Identifies the ratio of the map or cartographic product to the true location. The data element for scale should be the X value of the 1:X ratio (e.g., if the scale is 1:24,000, the value of the scale data element should be 24,000). The United States Geological Survey 1:24,000 is usually the smallest reasonable scale for locating sub-facility points, such as stacks or pipes. The relative accuracies of maps as a locational tool decreases as the X value increases. This field is required when the Horizontal Collection Method is based upon using a map. This data element is required by EPA Locational Data Policy. More information regarding EPA's data standards and policies may be found on EPA's Environmental Data Registry (EDR) Website (<http://www.epa.gov/edr/>).

**Attributes:** Numeric  
12 digits (nnnnnnnnnnnnnn)  
Mandatory (for Insert)

**Coding Instructions:** Place a valid LDP source scale value in the thirteenth delimited field.



**Business Rules**Common Rules:

None.

Insert Rules

1. LDP Source Scale is mandatory.

**Error Messages:**

1. Cannot insert NULL into ("AIRSRAQS"."SITES"."LDP\_SOURCE\_SCALE")

Update Rules

None.

Delete Rules

None.

**4.1.14 LDP Measurement Accuracy Value**

**Description:** Description of the accuracy of the site coordinates, as a range reported in meters. Only the least accurate measurement needs to be recorded, whether it is latitude or longitude (or UTM easting or northing).

For example, here are accuracy standards for various scale maps, assuming that the maps conform to the national mapping accuracy standards:

1:1,200 ± 3.33 feet

1:2,400 ± 6.67 feet

1:4,800 ± 13.33 feet

1:10,000 ± 27.78 feet

1:12,000 ± 33.33 feet

1:24,000 ± 40.00 feet

1:63,360 ± 105.60 feet

1:100,000 ± 166.67 feet

Map interpolation would also introduce error.

For GPS, the accuracy values vary. The type of GPS used along with operating conditions affect accuracy. The GPS receiver may provide accuracy values associated with specific coordinate readings.

This data element is required by EPA Locational Data Policy (LDP). More information regarding EPA's data standards and policies may be found on EPA's Environmental Data Registry (EDR) Website (<http://www.epa.gov/edr/>).

**Attributes:** Numeric  
10 digits, including 2 decimal places (nnnnnnnn.nn)  
Mandatory (for Insert)

**Coding Instructions:** Place the LDP measurement accuracy value in the fourteenth delimited field.

**Business Rules**Common Rules:

1. LDP Measurement Accuracy Value must be greater than 0.

**Error Messages:**

1. Invalid Horizontal Accuracy Value

Insert Rules

1. LDP Measurement Accuracy Value is mandatory.

**Error Messages:**

1. Cannot insert NULL into ("AIRSRAQS"."SITES"."LDP\_ACC\_VALUE")

Update Rules

None.

Delete Rules

None.

**4.1.15 LDP Vertical Measure**

**Description:** The elevation, in meters, above or below mean sea level (MSL) of the site. Required by EPA Locational Data Policy (LDP). More information regarding EPA's data standards and policies may be found on EPA's Environmental Data Registry (EDR) Website (<http://www.epa.gov/edr/>).

**Attributes:** Numeric  
10 digits, including 2 decimal places (nnnnnnnn.nn)  
Mandatory (for Insert)

**Coding Instructions:** Place a numeric value in the fifteenth delimited field.

**Business Rules**Common Rules:

1. Vertical Measure must be between -10000 and 20000.

**Error Messages:**

1. Vertical measure must be between -10,000 and 20,000

Insert Rules

1. Vertical Measure is mandatory.

**Error Messages:**

1. Cannot insert NULL into ("AIRSRAQS"."SITES"."LDP\_VERT\_MEAS")

Update Rules

None.

Delete Rules

None.

#### 4.1.16 Time Zone

**Description:** A standard time zone, as established by section 1 of the Standard Time Act, as amended by section 4 of the Uniform Time Act of 1966 (15 U.S.C. 261).

**Attributes:** Alphanumeric  
Up to 30 characters  
Optional

**Coding Instructions:** To insert or update a time zone, place a valid value in the sixteenth delimited field. A time zone value is valid if it exists in combination with state code in the State Time Zones Table.

#### Business Rules

Common Rules:

1. (State Code, Time Zone) must be in STATE\_TIME\_ZONES table.

**Error Messages:**

1. Integrity constraint (AIRSRAQS.SI\_STZ\_FK) violated
2. STATE\_TIME\_ZONES (STT\_STATE\_CODE, TZ\_TIME\_ZONE\_NAME) must be at production status.

**Error Messages:**

1. Status for STT\_STATE\_CODE, TZ\_TIME\_ZONE\_NAME is inactive.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

#### 4.1.17 Support Agency

**Description:** Identifies the agency responsible for the operation of the monitoring site.

**Attributes:** Alphanumeric  
4-digit code  
Mandatory (for insert)

**Coding Instructions:** To insert or update, place a valid agency code in the seventeenth delimited field. A support agency value is valid if it exists in combination with the state code value in the State Agencies Table.

**Business Rules**Common Rules:

1. (State Code, Supporting Agency) must be in STATE\_AGENCIES table.  
**Error Messages:**
  1. Integrity constraint (AIRSRAQS.AR1\_SA\_FK) violated
2. STATE\_AGENCIES (STT\_STATE\_CODE, AG\_AGENCY\_CODE) must be at production status.  
**Error Messages:**
  1. Status for STT\_STATE\_CODE, AG\_AGENCY\_CODE is inactive.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

**4.1.18 Street Address**

**Description:** Specifies the building/street location of the monitoring site.

**Attributes:**           Alphanumeric  
                              Up to 2000 characters  
                              Mandatory (for Insert)

**Coding Instructions:** Place street address text in the eighteenth delimited field. Any non-blank value is valid.

**Business Rules**Common Rules:

None.

Insert Rules

1. Street Address is mandatory.  
**Error Messages:**
  1. Cannot insert NULL into ("AIRSRAQS"."SITES"."STREET\_ADDRESS").

Update Rules

None.

Delete Rules

None.

### 4.1.19 City Code

**Description:** The city within whose legal boundaries the monitoring site is located.

**Attributes:** Alphanumeric  
5-digit code  
Mandatory (for Insert)

**Coding Instructions:** Place a valid FIPS city code value in the nineteenth delimited field. A city code value is valid if it exists in combination with state code and county code in the County Cities Table. If the site is not within a city, use code 00000.

#### Business Rules

##### Common Rules:

1. (State Code, County Code, City Code) must be in COUNTY\_CITIES table.

**Error Messages:**

1. Integrity constraint (AIRSRAQS.SI\_CC\_FK) violated
2. COUNTY\_CITIES (CN\_STT\_STATE\_CODE, CN\_COUNTY\_CODE, CI\_CITY\_CODE) must be at production status.

**Error Messages:**

1. Status for CN\_STT\_STATE\_CODE, CN\_COUNTY\_CODE, CI\_STT\_STATE\_CODE, CI\_CITY\_CODE is inactive.

##### Insert Rules

1. City Code is mandatory.

**Error Messages:**

1. Cannot insert NULL into ("AIRSRAQS"."SITES"."CC\_CI\_CITY\_CODE")

##### Update Rules

None.

##### Delete Rules

None.

### 4.1.20 Urban Area Code

**Description:** The urbanized area within which the monitoring site is located. An urbanized area is a U.S. Census Bureau demographic entity that comprises a place and the adjacent densely-settled surrounding territory that together have a minimum population of 50,000 people.

**Attributes:** Alphanumeric  
4-digit code  
Mandatory (for Insert)

**Coding Instructions:** Place a valid urban area code value in the twentieth delimited field. An urban area code value is valid if it exists in combination with state code in the State Urbanized Areas Table. If the monitoring site is not within an urbanized area, use code 0000.

**Business Rules:**Common Rules:

1. (State Code, Urban Area Code) must be in STATE\_URBANIZED\_AREAS table

**Error Messages:**

1. Integrity constraint (AIRSRAQS.SI\_SUA\_FK) violated
2. STATE\_URBANIZED\_AREAS (STT\_STATE\_CODE, UA\_UAR\_CODE) must be at production status.

**Error Messages:**

1. Status for STT\_STATE\_CODE, UA\_UAR\_CODE is inactive.

Insert Rules

1. Urban Area Code is mandatory.

**Error Messages:**

1. Cannot insert NULL into ("AIRSRAQS"."SITES"."SUA\_UA\_UAR\_CODE")

Update Rules

None.

Delete Rules

None.

**4.1.21 AQCR**

**Description:** Specifies in which of the 247 Air Quality Control Regions (AQCRs) the monitoring site is located.

**Attributes:** Alphanumeric  
3-digit code  
Mandatory (for Insert)

**Coding Instructions:** To insert or update AQCR, place a valid AQCR code in the twenty-first delimited field. A valid AQCR code is one that, in combination with state code and county code, exists in the AQCR Counties Table.

**Business Rules:**Common Rules:

1. (AQCR, State Code, County Code) must be in AQCR\_COUNTIES table.

**Error Messages:**

1. Integrity constraint (AIRSRAQS.SI\_AQCRC\_FK) violated

- 
2. AQCR\_COUNTIES (AQ\_AQCR\_CODE, CN\_STT\_STATE\_CODE, CN\_COUNTY\_CODE) must be at production status.

**Error Messages:**

1. Status for AQ\_AQCR\_CODE, CN\_STT\_STATE\_CODE, CN\_COUNTY\_CODE is inactive

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 4.1.22 Land Use

**Description:** Categorization of the prevalent land use within 1/4 mile of the monitoring site.

**Attributes:** Alphanumeric  
Up to 20 characters  
Mandatory (for Insert)

**Coding Instructions:** Place a valid land use type term in the twenty-second delimited field. A land use term is valid if it exists in the Land Use Types Table.

**Business Rules:**Common Rules:

1. Land Use must be in LAND\_USE\_TYPES table.

**Error Messages:**

1. Integrity constraint (AIRSRAQS.SI\_LUT\_FK) violated
  2. LAND\_USE\_TYPES (LAND\_USE\_TYPE) must be at production status
- Error Messages:**
1. Status for LAND\_USE\_TYPE is inactive

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 4.1.23 Location Setting

**Description:** A description of the environmental setting within which the site is located.

**Attributes:** Alphanumeric  
Up to 50 characters  
Mandatory (for Insert)

**Coding Instructions:** Place a valid location setting term in the twenty-third delimited field. A location setting term is valid if it exists in the Location Settings Table.

**Business Rules:**

Common Rules:

1. Location Setting must be in LOCATION\_SETTINGS table.

**Error Messages:**

1. Integrity constraint (AIRSRAQS.SI\_LS\_FK) violated
2. LOCATION\_SETTINGS (LOCATION\_SETTING) must be at production status.

**Error Messages:**

1. Status for LOCATION\_SETTING is inactive.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 4.1.24 Date Site Established

**Description:** The date on which an air monitoring site began collecting air quality data.

**Attributes:** Date  
8-digit date  
Mandatory (for Insert)

**Coding Instructions:** Place a date, using the format YYYYMMDD, in the twenty-fourth delimited field. The date must be between January 1, 1957 and a year after the current date.



**Business Rules:**Common Rules:

1. Date Site Established must be between 1/1/1957 and one year from the current date.

**Error Messages:**

1. The Site Established Date is not within the valid date range.

Insert Rules

1. Date Site Established is mandatory.

**Error Messages:**

1. Cannot insert NULL into ("AIRSRAQS"."SITES"."SITE\_ESTAB\_DATE")

Update Rules

None.

Delete Rules

None.

**4.1.25 Date Site Terminated**

**Description:** The date on which a monitoring site ceased to operate.

**Attributes:** Date  
8-digit date  
Optional

**Coding Instructions:** Place a date, using the format YYYYMMDD, in the twenty-fifth delimited field. The date must be between January 1, 1957 and the current date, and must be greater than date site established. All monitors at a site must have a date sampling ended before a site can be terminated.

**Business Rules:**Common Rules:

1. Date Site Terminated must be between Date Site Established and one year from the current date.

**Error Messages:**

1. The Site Terminated Date is not within the valid date range.

2. Date Site Terminated may be valued only if all the sample periods for the site's monitors are closed, I.e., have end dates.

**Error Messages:**

1. All monitors must be closed to terminate a site. Open monitors: (List of open monitor Ids)

3. Date Site Terminated must be greater than, or equal to, all sample period end dates for the site's monitors.

**Error Messages:**

1. Site terminated date must be equal to or greater than Sampling Period End Date.

4. Date Site Terminated must be greater than, or equal to, all reporting organization end dates for the site's monitors.  
**Error Messages:**
  1. Site terminated date must be equal to or greater than Reporting Org. End Date.
5. Date Site Terminated must be greater than, or equal to, all collocation end dates for the site's monitors.  
**Error Messages:**
  1. The collocation period end date must be less than or equal to the site termination date.
6. Date Site Terminated must be greater than, or equal to, all monitor type assignment end dates for the site's monitors .  
**Error Messages:**
  1. The monitor type end date must be less than or equal to the site termination date
7. Date Site Terminated must be greater than, or equal to, all required collection frequency end dates for the site's monitors.  
**Error Messages:**
  1. The required collection frequency end date must be less than or equal to the site termination date.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

#### 4.1.26 ZIP Code

**Description:** The U.S. Postal Service Zone Improvement Plan (ZIP) Code used to address the monitoring site.

**Attributes:** Alphanumeric  
5- or 9-digit code  
Optional

**Coding Instructions:** Place a valid 5-digit or 9-digit ZIP Code in the twenty-sixth delimited field. A ZIP Code value is valid if it exists in combination with state code and county code in the County ZIP Codes Table.

**Business Rules:**Common Rules:

1. (State Code, County Code, Zip Code) must be in COUNTY\_ZIP\_CODES table.  
**Error Messages:**
  1. Integrity constraint (AIRSRAQS.SI\_CZC\_FK) violated
2. (State Code, County Code, Zip Code) must be at production status.  
**Error Messages:**
  1. Status for CN\_STT\_STATE\_CODE, CN\_COUNTY\_CODE, ZC\_ZIP\_CODE is inactive.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

**4.1.27 Congressional District**

**Description:** The Congressional district within which the site is located.

**Attributes:**           Alphanumeric  
                              2-digit code  
                              Optional

**Coding Instructions:** Place a valid Congressional district number in the twenty-seventh delimited field. A Congressional district value is valid if it exists in combination with state code in the Congressional Districts Table. If there is only one Congressional district in a state (in which case the district is not numbered), enter the value of 1.

**Business Rules:**Common Rules:

1. (State Code, Congressional District) must be in CONGRESSIONAL\_DISTRICTS table.  
**Error Messages:**
  1. Integrity constraint (AIRSRAQS.SI\_CD\_FK) violated
2. (State Code, Congressional District) must be at production status.  
**Error Messages:**
  1. Status for STT\_STATE\_CODE, CONGR\_DISTR\_NUM is inactive.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

#### 4.1.28 Block

**Description:** The U.S. Census Bureau block within which the site is located.

**Attributes:** Alphanumeric  
4-digit code  
Optional

**Coding Instructions:** Block information must be submitted in conjunction with block group and census tract. Place a valid block number in the twenty-eighth delimited field. A block value is valid if it exists in combination with state code, county code, block group, and census tract in the Blocks Table.

**Business Rules:**Common Rules:

1. (State Code, County Code, Census Tract, Block Group, Block) must be in BLOCKS table.

**Error Messages:**

1. Integrity constraint (AIRSRAQS.SI\_BL\_FK) violated
2. (State Code, County Code, Census Tract, Block Group, Block) must be at production status.

**Error Messages:**

1. Status for BG\_CT\_CN\_STT\_STATE\_CODE, BG\_CT\_CN\_COUNTY\_CODE, BG\_CT\_CENSUS\_TRACT\_NUM, BG\_BLOCK\_GROUP\_NUM, BLOCK\_NUM is inactive.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 4.1.29 Block Group

**Description:** The U.S. Census Bureau block group within which the site is located.

**Attributes:** Alphanumeric  
1-digit code  
Optional

**Coding Instructions:** Block group information must be submitted in conjunction with block and census tract. Place a valid block group number in the twenty-ninth delimited field. A block group value is valid if it exists in combination with state code, county code, block, and census tract in the Blocks Table.

**Business Rules:**

Common Rules:

1. (State Code, County Code, Census Tract, Block Group, Block) must be in BLOCKS table.

**Error Messages:**

1. Integrity constraint (AIRSRAQS.SI\_BL\_FK) violated
2. (State Code, County Code, Census Tract, Block Group, Block) must be at production status.

**Error Messages:**

1. Status for BG\_CT\_CN\_STT\_STATE\_CODE, BG\_CT\_CN\_COUNTY\_CODE, BG\_CT\_CENSUS\_TRACT\_NUM, BG\_BLOCK\_GROUP\_NUM, BLOCK\_NUM is inactive

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 4.1.30 Census Tract

**Description:** The U.S. Census Bureau census tract/block numbering area within which the site is located.

**Attributes:** Alphanumeric  
3- to 6-digit code  
Optional

**Coding Instructions:** Census tract information must be submitted in conjunction with block and block group. Place a valid census tract code in the thirtieth delimited field. A census tract value is valid if it exists in combination with state code, county code, block, and block group in the Blocks Table.

**Business Rules:**Common Rules:

1. (State Code, County Code, Census Tract, Block Group, Block) must be in BLOCKS table.

**Error Messages:**

1. Integrity constraint (AIRSRAQS.SI\_BL\_FK) violated
2. (State Code, County Code, Census Tract, Block Group, Block) must be at production status.

**Error Messages:**

1. Status for BG\_CT\_CN\_STT\_STATE\_CODE, BG\_CT\_CN\_COUNTY\_CODE, BG\_CT\_CENSUS\_TRACT\_NUM, BG\_BLOCK\_GROUP\_NUM, BLOCK\_NUM is inactive

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

**4.1.31 Class I Area**

**Description:** The Class One Area within which the site is located. A Class One Area is a geographic area recognized by EPA as being of the highest environmental quality and requiring maximum protection.

**Attributes:** Alphanumeric  
6-character code  
Optional

**Coding Instructions:** Place a valid Class One Area code in the thirty-first delimited field. A Class One Area code is valid if it exists in the Class One Areas Table.

**Business Rules:**Common Rules:

1. Class 1 Area must be in CLASS\_ONE\_AREAS table.

**Error Messages:**

1. Integrity constraint (AIRSRAQS.SI\_COA\_FK) violated

- 
2. CLASS\_ONE\_AREAS (CLASS\_1\_AREA\_CODE) must be at production status.

**Error Messages:**

1. Status for CLASS\_1\_AREA\_CODE is inactive

**Insert Rules**

None.

**Update Rules**

None.

**Delete Rules**

None.

### 4.1.32 Local Region

**Description:** The state-specific geographic/administrative area within which the site is located.

**Attributes:**           Alphanumeric  
                          1- to 2-digit code  
                          Optional

**Coding Instructions:** Place a valid local region code in the thirty-second delimited field. A local region code is valid if it exists in combination with state code in the Local Regions Table.

**Business Rules:****Common Rules:**

1. (State Code, Local Region) must be in LOCAL\_REGIONS table.

**Error Messages:**

1. Integrity constraint (AIRSRAQS.SI\_LR\_FK) violated
2. (State Code, Local Region) must be at production status.
- Error Messages:**
1. Status for STT\_STATE\_CODE, LOCAL\_REGION\_CODE is inactive

**Insert Rules**

None.

**Update Rules**

None.

**Delete Rules**

None.

---

### 4.1.33 Local Site Name

**Description:** The locally defined name of the site.

**Attributes:** Alphanumeric  
Up to 70 characters  
Optional

**Coding Instructions:** Place a text description of the locally-defined site name in the thirty-third delimited field. Any non-blank value is valid.

**Business Rules:**

Common Rules:

None.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 4.1.34 HQ Evaluation Date

**Description:** The date on which the most recent headquarters (HQ) evaluation of the site occurred.

**Attributes:** Date  
8-digit date  
Optional

**Coding Instructions:** Place a date, in the format YYYYMMDD, in the thirty-fourth delimited field. To be valid, HQ evaluation date must be between January 1, 1980 (when the National Air Monitoring Sites Regulations were published) and the current date.

**Business Rules:**

Common Rules:

1. Hq Evaluation Date must be between 6/1/1977 and Date Site Terminated, (or the current date, if Date Site Terminated is not valued.)

**Error Messages:**

1. The headquarters evaluation date is not within the valid range.
2. User must have HQ application role to insert or update the HQ Evaluation Date.

**Error Messages:**

1. Insufficient privileges to enter HQ\_Eval\_Date



Insert Rules

None.

Update Rules

None.

Delete Rules

None.

#### 4.1.35 Regional Evaluation Date

**Description:** The date on which the most recent regional evaluation of the site for siting criteria occurred.

**Attributes:** Date  
8-digit date  
Optional

**Coding Instructions:** Place a date, in the format YYYYMMDD, in the thirty-fifth delimited field. To be valid, regional evaluation date must be between January 1, 1980 (when the National Air Monitoring Sites Regulations were published) and the current date.

**Business Rules:**

Common Rules:

1. Regional Evaluation Date must be between 6/1/1977 and Date Site Terminated, (or the current date, if Date Site Terminated is not valued.)

**Error Messages:**

1. The regional evaluation date is not within the valid range.
2. User must have Regional\_Admin application role to insert or update the HQ Evaluation Date.

**Error Messages:**

1. Insufficient privileges to enter Regional\_Eval\_Date

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

#### 4.1.36 Compass Sector

**Description:** A representation of the true, as opposed to magnetic, direction of the site

from the central business district. If the site is within the central business district, it is a representation of the direction the probe faces.

**Attributes:**           Alphanumeric  
                          Up to 3-character code  
                          Optional

**Coding Instructions:** Place a valid compass sector value in the thirty-sixth delimited field. A compass sector value is valid if it exists in the Compass Sectors Table.

**Business Rules:**

Common Rules:

1. Compass Sector must be in Compass\_Sectors table

**Error Messages:**

1. Integrity constraint (AIRSRAQS.SI\_CS\_FK) violated
2. Compass Sector must be at production status.  
**Error Messages:**
  1. Status for COMPASS\_SECTOR is inactive.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

#### **4.1.37 Distance to City**

**Description:**           The distance, in kilometers, to the site from the center of the downtown central business district of the city in which the site is located.

**Attributes:**           Numeric  
                          10 digits, including 2 decimal places (nnnnnnnn.nn)  
                          Optional

**Coding Instructions:** Place a numeric value greater than 0 and less than 1000 in the thirty-seventh delimited field.

**Business Rules:**

Common Rules:

1. Distance to City must be between 0 AND 1000.

**Error Messages:**

1. The City Distance Measurement must be a value between 0 and 1000.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

**4.1.38 Type Meteorological Site**

**Description:** The type of meteorological station identified for the monitoring site.  
Required for sites with monitors in a Photochemical Assessment  
Monitoring System (PAMS) network.

**Attributes:** Alphanumeric  
Up to 20 characters  
Optional

**Coding Instructions:** Place a valid type meteorological site in the thirty-eighth delimited field.  
A type meteorological site value is valid if it exists in the Met Site Types  
Table.

**Business Rules:**Common Rules:

1. Type Meteorological Site must be in MET\_SITE\_TYPES table

**Error Messages:**

1. Integrity constraint (AIRSRAQS.SI\_MST\_FK) violated
  2. Type Meteorological Site must be at production status
- Error Messages:**
1. Met\_Site\_Type is inactive.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

**4.1.39 Meteorological Site ID**

**Description:** The AQS site ID where meteorological data is collected, if not collected  
at this site.

**Attributes:** Alphanumeric

9-digit ID  
Optional

**Coding Instructions:** Place a valid AQS site ID in the thirty-ninth delimited field. The format for AQS site ID is a joining of a FIPS state code (2 characters), a FIPS county code (3 numeric characters), and 4-digit site ID. A meteorological site ID value is valid if it represents an existing site (a row on the Sites Table), and type meteorological site is other AQS site.

**Business Rules:**

Common Rules:

1. Meteorological Site ID must be in SITES table.

**Error Messages:**

1. Integrity constraint (AIRSRAQS.SI\_SI\_FK) violated
2. Met Site ID must be valued when Met Site Type is "OTHER AIRS SITE"; otherwise, it must not be valued.

**Error Messages:**

1. Met Site must be defined for Met Site Type = "OTHER AIRS SITE" and must be Null for all other Met Site Types.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

#### 4.1.40 Distance to Meteorological Site

**Description:** The distance of the associated meteorological site from the air quality monitoring site, in meters. This information is required if the site has monitors that are part of a Photochemical Assessment Monitoring System (PAMS) network. The associated site need not be a AQS site.

**Attributes:** Numeric  
10 digits, including 2 decimal places (nnnnnnnn.nn)  
Optional

**Coding Instructions:** Place a valid numeric distance to meteorological site value in the fortieth delimited field. The distance to meteorological site is valid if it is greater than 0 and type meteorological site is not on-site met equip and not on-site Upper Air meteorological site (UA met). A distance to meteorological site value may be nullified, if type meteorological site is nullified, on-site met equip, or on-site UA met.

**Business Rules:**Common Rules:

1. Distance to Meteorological Site must be valued and greater than 0 when Met Site Type is "OTHER AIRS SITE", "NWS", "AIRPORT", or "OTHER"; otherwise, it must not be valued.

**Error Messages:**

1. Met Site Distance must be defined and greater than 0 for Types "OTHER AIRS SITE", "NWS", "AIRPORT", "OTHER" and must be Null for all other Types.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

**4.1.41 Direction to Meteorological Site**

**Description:** A representation of the true, as opposed to magnetic, direction of the meteorological site from this site.

**Attributes:** Alphanumeric  
Up to 3-character code  
Optional

**Coding Instructions:** Place a valid direction to met site value in the forty-first delimited field. A direction to met site value is valid if it exists in the Compass Sectors Table and type meteorological site is not on-site met equip and not on-site Upper Air meteorological site (UA met). A direction to met site value may be nullified, if type meteorological site is nullified, on-site met equip or on-site UA met.

**Business Rules:**Common Rules:

1. Direction to Meteorological Site must be in COMPASS\_SECTORS table.

**Error Messages:**

1. Integrity constraint (AIRSRAQS.SI\_CS\_FK) violated
2. Direction to Meteorological Site must be at production status.  
**Error Messages:**
  1. Status for COMPASS\_SECTOR is inactive.
3. Direction to Meteorological Site must be valued and greater than 0 when Met Site Type is "OTHER AIRS SITE", "NWS", "AIRPORT", or "OTHER"; otherwise, it must not be valued.

**Error Messages:**

1. Met Site Distance must be defined and greater than 0 for Types "OTHER AIRS SITE", "NWS", "AIRPORT", "OTHER" and must be Null for all other Types.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

**4.1.42 State or Local ID**

**Description:** Identification code used by a state or local agency, if different from the AQS site ID.

**Attributes:** Alphanumeric  
Up to 40 characters  
Mandatory

**Coding Instructions:** Place an alphanumeric value in the forty-second delimited field. No edit checks are performed.

**Business Rules**

There are no business rules for State or Local ID.

**4.1.43 LDP Vertical Method**

**Description:** The method used to determine the Locational Data Policy (LDP) vertical measure. This data element is required by EPA LDP. More information regarding EPA's data standards and policies may be found on EPA's Environmental Data Registry (EDR) Website (<http://www.epa.gov/edr/>).

**Attributes:** Alphanumeric  
3-digit code  
Mandatory (for Insert)

**Coding Instructions:** Place a valid LDP vertical method code in the forty-third delimited field. View vertical method code descriptions in the Appendices, or via Discoverer, and choose the appropriate code. Examples of the LDP Vertical Method Codes as of September 11, 2003 are given below:

Code	Description
001	GPS CARRIER PHASE STATIC RELATIVE POSITION
002	GPS CARRIER PHASE KINEMATIC RELATIVE POSITION
003	GPS CODE (PSEUDO RANGE) DIFFERENTIAL
004	GPS CODE (PSEUDO RANGE)PRECISE POSITION

005	GPS CODE (PSEUDO RANGE)STANDARD POSITION (SA OFF)
006	GPS CODE (PSEUDO RANGE)STANDARD POSITION (SA ON)
007	CLASSICAL SURVEYING TECHNIQUES
008	OTHER
009	ALTIMERY
010	PRECISE LEVELING-BENCH MARK
011	LEVELING-NON BENCH MARK CONTROL POINTS
012	TRIGONOMETRIC LEVELING
013	PHOTOGRAMMETRIC
014	TOPOGRAPHIC MAP INTERPOLATION
000	UNKNOWN

**Business Rules:**

Common Rules:

1. Vertical Collection Method must be in LDP\_VERTICAL\_METHODS table.

**Error Messages:**

1. Integrity constraint (AIRSRAQS.SI\_LDPVM\_FK) violated

2. Vertical Collection Method must be at production status.

**Error Messages:**

1. Status for LDP\_VERTICAL\_METHOD\_CODE is inactive.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

#### 4.1.44 LDP Vertical Datum

**Description:**

The edition of North American Datum used as the basis for determining the site coordinates. (The editions of North American Datum establish a network of monuments and reference points defining a mathematical surface from which geographic computations can be made.) This data element is required by EPA Locational Data Policy (LDP). More information regarding EPA's data standards and policies may be found on EPA's Environmental Data Registry (EDR) Website (<http://www.epa.gov/edr/>).

**Attributes:**

Alphanumeric  
Up to 120 characters

Mandatory (for Insert)

**Coding Instructions:** Place a valid LDP vertical datum value in the forty-fourth delimited field. A value is valid if it is in the LDP Vertical Data Table. Examples of the LDP Vertical Datum Values as of September 11, 2003 are given below:

LDP Vertical Datum

NAVD88

NGVD29

MEAN SEA-LEVEL

LOCAL TIDAL DATUM

UNKNOWN

**Business Rules:**

Common Rules:

1. Vertical Datum must be in LDP\_VERTICAL\_DATA table.

**Error Messages:**

1. Integrity constraint (AIRSRAQS.SI\_LDPVD\_FK) violated.
2. Vertical Datum references must be at production status..

**Error Messages:**

1. Status for LDP\_VERTICAL\_DATUM is inactive.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

#### 4.1.45 LDP Vertical Accuracy Value

**Description:** Description of the accuracy of the LDP vertical measure, reported in meters. This data element is required by EPA Locational Data Policy (LDP). More information regarding EPA's data standards and policies may be found on EPA's Environmental Data Registry (EDR) Website (<http://www.epa.gov/edr/>).

**Attributes:** Numeric  
10 digits, including 2 decimal places (nnnnnnnn.nn)  
Mandatory (for Insert)

**Coding Instructions:** Place the LDP vertical accuracy value in the forty-fifth delimited field.

**Business Rules:**



Common Rules:

1. Vertical Accuracy must be greater than 0.

**Error Messages:**

1. Invalid Vertical Accuracy Value.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

## 4.2 Site Street Information - Transaction Type AB

See the transaction requirements in the Appendices for a list of transactions required to create sites and monitors.

See the data input transaction formats in the Appendices for a list of required fields for each transaction format.

### Transaction Level Rules and Errors

1. The Site Tangent Street cannot be deleted if a corresponding Monitor Tangent Street has been loaded.

#### Error Messages:

1. Foreign Key (MTR\_TR\_ID) violated.

### 4.2.1 Transaction Type

**Description:** Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

**Attributes:**           Alphanumeric  
                              2-character code  
                              Mandatory

**Coding Instructions:** Place AB in the first delimited field.

#### Business Rules:

##### Common Rules

1. Transaction Type is mandatory

#### Error Messages:

1. Transaction Type is Required.
2. Transaction Type must be in TRANSACTION\_TYPES table in database.

#### Error Messages:

1. Invalid Transaction Type.

##### Insert Rules

None.

##### Update Rules

None.

##### Delete Rules

None.

### 4.2.2 Action Code

**Description:** Indicates the data manipulation action to be performed by the transaction.

**Attributes:** Alphanumeric  
1-character code  
Mandatory

**Coding Instructions:** Place the values I, U, or D in the second delimited field.  
I - Insert a new row into the appropriate table in the database.  
U - Change one or more column values for an existing row in one or more tables.  
D - Delete a row from a table(s) for the row containing the key data.

#### Business Rules

##### Common Rules

1. Action Code is required.  
**Error Messages:**
  1. Action Code is Required.
2. Action Code must be either 'I', 'U', or 'D'..  
**Error Messages:**
  1. Invalid Action Code.

##### Insert Rules

None.

##### Update Rules

None.

##### Delete Rules

None.

### 4.2.3 State Code

**Description:** A FIPS code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

**Attributes:** Alphanumeric  
2-character code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid FIPS state code in delimited field 3. A code is valid if it exists in the States Table.

**Business Rules**Common Rules:

1. State Code is mandatory.  
**Error Messages:**
  1. State Code is required.
2. A Site with (State Code, County Code, Site ID) must be in the SITES table  
**Error Messages:**
  1. Invalid Site..
  2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

**4.2.4 County Code**

**Description:** A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

**Attributes:** Alphanumeric  
3-digit code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid county code in the fourth delimited field. A code is valid if it exists in combination with state code and city code, in the County Cities Table.

**Business Rules**Common Rules:

1. County Code is required.  
**Error Messages:**
  1. County Code is required.
2. A Site with (State Code, County Code, Site ID) must be in the SITES table  
**Error Messages:**
  1. Invalid Site..
  2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

### 4.2.5 Site ID

**Description:** A numeric identifier (ID) that uniquely identifies each air monitoring site within a county.

**Attributes:**           Alphanumeric  
                              4-digit ID  
                              Mandatory  
                              Key Field

**Coding Instructions:** Place a four-digit numeric code in the fifth delimited field. A site ID value is valid if it exists in combination with state code and county code in the Sites Table.

**Business Rules**Common Rules:

1. Site ID is mandatory.

**Error Messages:**

1. Site ID is required.

2. Site ID must be exactly 4 digits.

**Error Messages:**

1. Invalid Site ID length

3. (State Code, County Code, Site ID) must be in the SITES table.

**Error Messages:**

1. Invalid Site..
2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

### 4.2.6 Tangent Street Number

**Description:** Identifies the number of the street around the site for which the data are being submitted. If street name, type road, traffic flow, year of traffic flow, or direction to street is valued, street number must be valued. Street number is used to associate detailed street information for the site to streets closest to the monitors at this site.

**Attributes:** Numeric  
2 digits (nn)  
Mandatory  
Key Field

**Coding Instructions:** Place a valid number in the sixth delimited field.

#### Business Rules:

##### Common Rules

1. Tangent Street Number is mandatory.

**Error Messages:**

1. Cannot insert NULL into  
("AIRSRAQS"."TANGENT\_ROADS"."TANGENT\_ROAD\_NUM")

2. Tangent Street Number must be greater than 0.

**Error Messages:**

1. Check constraint (AIRSRAQS.TR\_TRN\_GT\_0) violated

##### Insert Rules

1. (State Code, County Code, Site ID, Tangent Street Number) must not already be in database..

**Error Messages:**

1. Unique constraint (AIRSRAQS.TR\_SITETANRD1\_UK) violated

##### Update Rules

1. (State Code, County Code, Site ID, Tangent Street Number) must be in database.

**Error Messages:**

1. Tangent Street Number not in database

##### Delete Rules

1. (State Code, County Code, Site ID, Tangent Street Number) must be in database.

**Error Messages:**

1. Tangent Street Number not in database

### 4.2.7 Street Name

**Description:** The name of the street closest to the monitoring site.

**Attributes:**           Alphanumeric  
                          Up to 50 characters  
                          Mandatory (for Insert)

**Coding Instructions:** Place the street name in the seventh delimited field.

**Business Rules:**

Common Rules

None.

Insert Rules

1. Street Name is required.

**Error Messages**

1. Cannot insert NULL into TANGENT\_ROADS  
("AIRSRAQS"."TANGENT\_ROADS"."STREET\_NAME")

Update Rules

None.

Delete Rules

None.

## 4.2.8 Type Road

**Description:** The type of road or street being described.

**Attributes:**           Alphanumeric  
                          Up to 20 characters  
                          Mandatory (For Insert)

**Coding Instructions:** Place a valid type road term in the eighth delimited field. A type road value is valid if it exists on the Road Types Table.

**Business Rules:**

Common Rules

1. Type Road must be in ROAD\_TYPES table.

Error Messages:

1. Integrity constraint (AIRSRAQS.TR\_RT\_FK) violated
2. ROAD\_TYPES (ROAD\_TYPE) must be at production status  
Error Messages:
  1. Status for ROAD\_TYPE is inactive

Insert Rules

1. Type Road is mandatory.

**Error Messages:**

1. Cannot insert NULL into  
("AIRSRAQS"."TANGENT\_ROADS"."RT\_ROAD\_TYPE")

Update Rules

None.

Delete Rules

None.

## 4.2.9 Traffic Count

**Description:** An estimate of the daily traffic volume on the roadway.

**Attributes:** Numeric  
12 digits (nnnnnnnnnnnnnn)  
Mandatory (for Insert)

**Coding Instructions:** Place a valid traffic count in the ninth delimited field. A traffic count value is valid if it is greater than 0.

**Business Rules:**Common Rules

1. Traffic Count must be greater than 0.

**Error Messages:**

1. Check constraint (AIRSRAQS.TR\_DTC\_GT\_0) violated.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

## 4.2.10 Year of Traffic Count

**Description:** The year when the traffic count value was estimated.

**Attributes:** Date  
4-digit year (yyyy)  
Mandatory (for Insert)



**Coding Instructions:** Place a valid year of traffic count in the tenth delimited field. A year of traffic count value is valid if it is greater than 1957 and less than or equal to the current year.

**Business Rules:**Common Rules

1. Year of Traffic Count must be greater than, or equal to, 1957.

**Error Messages:**

1. A valid Daily Traffic Year is between 1957 and the current year
2. Year of Traffic Count cannot be valued if Traffic Count is not valued.  
**Error Messages:**
  1. Daily Traffic Year must be blank when Daily Traffic Count is blank
3. Year of Traffic Count must be valued if Traffic Count is valued.  
**Error Messages:**
  1. Daily Traffic Year is required when Daily Traffic Count is populated.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

**4.2.11 Direction to Street**

**Description:** The direction from the site to the street at its nearest point.

**Attributes:** Alphanumeric  
3-character code  
Mandatory (for Insert)

**Coding Instructions:** Place a valid direction to street in the eleventh delimited field. A direction to street value is valid if exists on the Compass Sectors Table.

**Business Rules:**Common Rules

1. Direction to Street must be in COMPASS\_SECTORS table.  
**Error Messages:**
  1. Integrity constraint (AIRSRAQS.TR\_CS\_FK) violated.

- 
2. COMPASS\_SECTORS (COMPASS\_SECTOR) must be at production status

**Error Messages:**

1. Status for COMPASS\_SECTOR is inactive.

Insert Rules

1. Direction to Street is mandatory..

**Error Messages:**

1. Cannot insert NULL into  
("AIRSRAQS"."TANGENT\_ROADS"."CS\_COMPASS\_SECTOR").

Update Rules

None.

Delete Rules

None.

## 4.2.12 Source of Traffic Count

**Description:** The method by which the traffic volume/flow count was obtained.

**Attributes:** Numeric  
10 digits (nnnnnnnnnn)  
Optional

**Coding Instructions:** Enter a valid source of traffic count code in the twelfth delimited field.  
A source of traffic count value is valid if it exists on the Traffic Volume Sources Table.

**Business Rules:**Common Rules

1. Source of Traffic Count must be in TRAFFIC\_VOLUME\_SOURCES table

**Error Messages:**

1. Integrity constraint (AIRSRAQS.TR\_TVS\_FK) violated
2. TRAFFIC\_VOLUME\_SOURCES (TVS\_ID) must be at production status.  
**Error Messages:**
  1. Status for TVS\_ID is inactive.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

## 4.3 Site Open Path Information - Transaction Type AC

See the transaction requirements in the Appendices for a list of transactions required to create sites and monitors. See the data input transaction formats in the Appendices for a list of required fields for each transaction format.

### 4.3.1 Transaction Type

**Description:** Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

**Attributes:**           Alphanumeric  
                              2-character code  
                              Mandatory

**Coding Instructions:** Place AC in the first delimited field.

#### **Business Rules:**

##### Common Rules

1. Transaction Type is mandatory

##### **Error Messages:**

1. Transaction Type is Required.
2. Transaction Type must be in TRANSACTION\_TYPES table in database.

##### **Error Messages:**

1. Invalid Transaction Type.

##### Insert Rules

None.

##### Update Rules

None.

##### Delete Rules

None.

### 4.3.2 Action Code

**Description:** Indicates the data manipulation action to be performed by the transaction.

**Attributes:**           Alphanumeric  
                              1-character code  
                              Mandatory

**Coding Instructions:** Place the values I, U, or D in the second delimited field.  
I - Insert a new row into the appropriate table in the database.  
U - Change one or more column values for an existing row in one or more tables.  
D - Delete a row from a table(s) for the row containing the key data.

**Business Rules**Common Rules

1. Action Code is required.  
**Error Messages:**
  1. Action Code is Required.
2. Action Code must be either 'I', 'U', or 'D'..  
**Error Messages:**
  1. Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

**4.3.3 State Code**

**Description:** A FIPS code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

**Attributes:** Alphanumeric  
2-character code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid FIPS state code in delimited field 3. A code is valid if it exists in the States Table.

**Business Rules**Common Rules:

1. State Code is mandatory.  
**Error Messages:**
  1. State Code is required.

- 
2. A Site with (State Code, County Code, Site ID) must be in the SITES table

**Error Messages:**

1. Invalid Site..
2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

### 4.3.4 County Code

**Description:** A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

**Attributes:** Alphanumeric  
3-digit code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid county code in the fourth delimited field. A code is valid if it exists in combination with state code and city code, in the County Cities Table.

**Business Rules**Common Rules:

1. County Code is required.

**Error Messages:**

1. County Code is required.
  2. A Site with (State Code, County Code, Site ID) must be in the SITES table
- Error Messages:**
1. Invalid Site..
  2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

### 4.3.5 Site ID

**Description:** A numeric identifier (ID) that uniquely identifies each air monitoring site within a county.

**Attributes:** Alphanumeric  
4-digit ID  
Mandatory  
Key Field

**Coding Instructions:** Place a four-digit numeric code in the fifth delimited field. A site ID value is valid if it exists in combination with state code and county code in the Sites Table.

**Business Rules**Common Rules:

1. Site ID is mandatory.

**Error Messages:**

1. Site ID is required.
2. Site ID must be exactly 4 digits.  
**Error Messages:**
  1. Invalid Site ID length
3. (State Code, County Code, Site ID) must be in the SITES table.  
**Error Messages:**
  1. Invalid Site..
  2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

### 4.3.6 Open Path Number

**Description:** A unique numeric identifier for the individual open path at a site.

**Attributes:**           Numeric  
                          2 digits (nn)  
                          Mandatory  
                          Key Field

**Coding Instructions:** Place a valid open path number in the sixth delimited field. An open path number value is valid if it is between 1 and 99.

**Business Rules:**

Common Rules

1. Open Path Number must be between 1 and 9

**Error Messages:**

1. Check constraint (AIRSRAQS.AVCON\_632668\_OPEN\_\_000) violated

Insert Rules

1. Open Path Number is mandatory

**Error Messages:**

1. Cannot insert NULL into  
("AIRSRAQS"."OPEN\_PATHS"."OPEN\_PATH\_NUM")

2. Open Path Number cannot already be entered for the site.

**Error Messages:**

1. Unique constraint (AIRSRAQS.TR\_SITEOPNPTH1\_UK) violated

Update Rules

1. Requested Open Path Number not in database for Site.

**Error Messages:**

1. Requested Open Path Number not in database

Delete Rules

1. Requested Open Path Number not in database for site.

**Error Messages:**

1. Requested Open Path Number not in database

### 4.3.7 Direction to Transmitter

**Description:**           The direction from the receiver to the transmitter at the site.

**Attributes:**           Alphanumeric  
                          Up to 3-character code  
                          Mandatory (for Insert)

**Coding Instructions:** Place a valid direction to transmitter in the seventh delimited field. A direction to transmitter value is valid if it exists on the Compass Sectors Table.

**Business Rules:**Common Rules

1. Direction to Transmitter must be in COMPASS\_SECTORS table.  
**Error Messages:**
  1. Integrity constraint (AIRSRAQS.TR\_CS\_FK) violated.
2. COMPASS\_SECTORS (COMPASS\_SECTOR) must be at production status  
**Error Messages:**
  1. Status for COMPASS\_SECTOR is inactive.

Insert Rules

1. Direction to Transmitter is mandatory..  
**Error Messages:**
  1. Cannot insert NULL into ("AIRSRAQS"."OPEN\_PATHS"."CS\_COMPASS\_SECTOR").

Update Rules

None.

Delete Rules

None.

**4.3.8 Beam Length**

**Description:** The length of the beam projected between the transmitter and the receiver at the site, in meters.

**Attributes:** Numeric  
10 digits, including 2 decimal places (nnnnnnnn.nn)  
Mandatory (for Insert)

**Coding Instructions:** Place a valid beam length in the eighth delimited field. A beam length value is valid if it is greater than 0.

**Business Rules:**Common Rules

1. Beam Length must be greater than 0.  
**Error Messages:**
  1. Check constraint (AIRSRAQS.OP\_POSITIVE\_BEAM\_LENGTH) violated.

Insert Rules

None.

Update Rules

None.



Delete Rules

None.

### 4.3.9 Height of Transmitter

**Description:** The height of the transmitter above the ground, in meters.

**Attributes:** Numeric  
10 digits, including 2 decimal places (nnnnnnnn.nn)  
Mandatory (for Insert)

**Coding Instructions:** Place a valid height of transmitter in the ninth delimited field. A height of transmitter value is valid if it is greater than 0.

**Business Rules:**Common Rules

1. Height of Transmitter must be greater than 0.

**Error Messages:**

1. Check constraint (AIRSRAQS.OP\_TRANSMITTER\_HEIGHT) violated.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 4.3.10 Height of Receiver

**Description:** The height of the receiver above the ground, in meters.

**Attributes:** Numeric  
10 digits, including 2 decimal places (nnnnnnnn.nn)  
Mandatory (for Insert)

**Coding Instructions:** Place a valid height of receiver in the tenth delimited field. A height of receiver value is valid if it is greater than 0.

**Business Rules:**Common Rules

1. Height of Receiver must be greater than 0.

**Error Messages:**

1. Check constraint (AIRSRAQS.OP\_RECEIVER\_HEIGHT) violated.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 4.3.11 Minimum Height

**Description:** The height of the beam (at the lowest point from the ground) being projected between the receiver and transmitter at the site, in meters.

**Attributes:** Numeric  
10 digits, including 2 decimal places (nnnnnnnn.nn)  
Mandatory

**Coding Instructions:** Place a valid minimum height value in the eleventh delimited field. A minimum height value is valid if it is greater than 0 and less than maximum height.

**Business Rules:**Common Rules

1. Minimum Height and Maximum height must be supplied together or not at all.

**Error Messages:**

1. Check constraint (AIRSRAQS.OP\_BEAM\_HEIGHT) violated.

2. If valued Minimum Height must be greater than 0.

**Error Messages:**

1. Check constraint (AIRSRAQS.OP\_BEAM\_HEIGHT) violated.

3. If valued Minimum Height must be less than Maximum Height,.

**Error Messages:**

1. Check constraint (AIRSRAQS.OP\_BEAM\_HEIGHT) violated.

Insert Rules

None

Update Rules

None.

Delete Rules

None.

### 4.3.12 Maximum Height

**Description:** The height of the beam (at the highest point from the ground) being projected between the receiver and transmitter at the site, in meters.

**Attributes:** Numeric  
10 digits, including 2 decimal places (nnnnnnnn.nn)  
Mandatory (for Insert)

**Coding Instructions:** Place a valid Maximum height value in the twelfth delimited field. A maximum height value is valid if it is greater than 0 and greater than minimum height.

**Business Rules:**Common Rules

1. Minimum Height and Maximum height must be supplied together or not at all.

**Error Messages:**

1. Check constraint (AIRSRAQS.OP\_BEAM\_HEIGHT) violated.
2. If valued Maximum Height must be greater than 0.  
**Error Messages:**
    1. Check constraint (AIRSRAQS.OP\_BEAM\_HEIGHT) violated.
3. If valued Maximum Height must be less than Maximum Height,.  
**Error Messages:**
    1. Check constraint (AIRSRAQS.OP\_BEAM\_HEIGHT) violated.

Insert Rules

None

Update Rules

None.

Delete Rules

None.

### 4.3.13 Land Use under Path

**Description:** The prevalent land use under the path of the beam being projected between the receiver and transmitter at the site.

**Attributes:** Alphanumeric  
Up to 20 characters  
Mandatory (for Insert)

**Coding Instructions:** Place a valid land use under path description in the thirteenth delimited field. A land use under path value is valid if it exists on the Land Use Types Table.

**Business Rules:**Common Rules

1. Land Use Under Path must be in LAND\_USE\_TYPES table  
**Error Messages:**
  1. Integrity constraint (AIRSRAQS.OP\_LUT\_FK) violated
2. LAND\_USE\_TYPES (LAND\_USE\_TYPE) must be at production status.  
**Error Messages:**
  1. Status for LAND\_USE\_TYPE is inactive

Insert Rules

1. Land Use Under Path is mandatory  
**Error Messages:**
  1. Cannot insert NULL into  
("AIRSRAQS"."OPEN\_PATHS"."LUT\_LAND\_USE\_TYPE")

Update Rules

None.

Delete Rules

None.

## 4.4 Site Comments (Online Update Only)

- Description:** Site comments is a free-format field that may be used in any way desired. It is commonly used to describe special features of a site. Multiple lines can be created by incrementing the sequence number. Online update only.
- Attributes:** 68 characters  
Optional
- Coding Instructions:** To insert or update, place the appropriate text in the comment fields using the maintain screen.

---

## 5.0 Monitor Transactions (MA - MK)

This set of eleven transactions is used to update monitor information in the site file.

Type MA, Basic Monitor Information, performs data manipulation on the Monitors and Pollutant Area Monitors Tables, and contains the following fields:

Transaction Type	Vertical Distance
Action Code	Surrogate Flag Indicator
State Code	Unrestricted Air Flow Indicator
County Code	Sample Residence Time
Site ID	Worst Site Type
Parameter	Applicable NAAQS Indicator
POC	Spatial Average Indicator
Project Class	Schedule Exemption Indicator
Dominant Source	Community Monitoring Zone
Measurement Scale	Pollutant Area Code – 1
Open Path Number	Pollutant Area Code – 2
Probe Location Code	Pollutant Area Code – 3
Probe Height	Pollutant Area Code – 4
Horizontal Distance	Pollutant Area Code – 5

Type MB, Monitor Sampling Periods, performs data manipulation on the Sample Periods Table, and contains the following fields:

Transaction Type	Parameter
Action Code	POC
State Code	Date Sampling Began
County Code	Date Sampling Ended
Site ID	

Type MC, Monitor Type Information, performs data manipulation on the Monitor Type Assignments Table, and contains the following fields:

Transaction Type	Parameter
Action Code	POC
State Code	Monitor Type
County Code	Monitor Type Begin Date
Site ID	Monitor Type End Date

Type MD, Monitor Agency Role, performs data manipulation on the Agency Roles Table, and contains the following fields:

Transaction Type	POC
Action Code	Agency Role Name
State Code	Agency Code
County Code	Begin Date
Site ID	End Date
Parameter	

Type ME, Monitoring Objective Information, performs data manipulation on the Monitor Objectives Table, and contains the following fields:

Transaction Type	POC
Action Code	Monitor Objective
State Code	Urban Area Represented
County Code	MSA Represented
Site ID	CMSA Represented
Parameter	

Type MF, Monitor Sampling Schedule, performs data manipulation on the Req Coll Frequencies and Sample Schedules Tables, and contains the following fields:

Transaction Type	RCF Code
Action Code	RCF Begin Date
State Code	RCF End Date
County Code	Collection Frequency January - December
Site ID	(12 instances)
Parameter	
POC	

Type MG, Monitor Street Description, performs data manipulation on the Monitor Tangent Roads Table, and contains the following fields:

Transaction Type	Parameter
Action Code	POC
State Code	Tangent Street Number
County Code	Distance from Monitor
Site ID	

Type MH, Monitor Obstruction Information, performs data manipulation on the Probe Obstructions Table, and contains the following fields:

Transaction Type	POC
Action Code	Type Obstruction
State Code	Direction from Monitor
County Code	Distance to Monitor
Site ID	Height of Obstruction
Parameter	

Type MI, Monitor Regulatory Compliance, performs data manipulation on the Regulation Compliances Table, and contains the following fields:

Transaction Type	Parameter
Action Code	POC
State Code	Monitor Regulation Code
County Code	Compliance Indicator
Site ID	Compliance Date

Type MJ, Monitor Collocation Period, performs data manipulation on the Monitor Collocations Table, and contains the following fields:

Transaction Type	POC
Action Code	Collocation Begin Date
State Code	Collocation End Date
County Code	Distance from Primary Monitor
Site ID	Primary Monitor Indicator
Parameter	

Type MK, Monitor Protocol performs data manipulation on the Monitor Protocols Table, and contains the following fields:

Transaction Type	Alternate MDL ID
Action Code	Sample Duration
State Code	Unit
County Code	Method
Site ID	Collection Frequency
Parameter	Composite Type
POC	Minimum Detect Value

Transaction Types MA, MB, MC, MD, and ME are required to create a new monitor for criteria pollutants. To insert a new monitor, either its parent site must already exist in the database, or the parent site must be created at the same time as the site transactions in the batch file. See the transaction requirements and data input formats in the Appendices for specific requirements.



Update transactions are used to change information for existing monitors. The values coded on an update transaction replace the values of the corresponding fields in the monitor related tables. If no value existed previously, the value from the transaction is inserted into the appropriate monitor related table row. Some fields are required, and cannot be deleted. They are identified in the coding instructions that follow, and in transaction formats.

## 5.1 Basic Monitor Information - Transaction Type MA

See the transaction requirements in the Appendices for a list of transactions required to create sites and monitors.

See the data input transaction formats in the Appendices for a list of required fields on each transaction format. For criteria pollutant monitors, transaction types MA through ME are required.

### 5.1.1 Transaction Type

**Description:** Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

**Attributes:**           Alphanumeric  
                          2-character code  
                          Mandatory

**Coding Instructions:** Place MA in the first delimited field.

#### **Business Rules:**

##### Common Rules

1. Transaction Type is mandatory

##### **Error Messages:**

1. Transaction Type is Required.
2. Transaction Type must be in TRANSACTION\_TYPES table in database.

##### **Error Messages:**

1. Invalid Transaction Type.

##### Insert Rules

None.

##### Update Rules

None.

##### Delete Rules

None.

### 5.1.2 Action Code

**Description:** Indicates the data manipulation action to be performed by the transaction.

**Attributes:**           Alphanumeric  
                          1-character code

Mandatory

**Coding Instructions:** Place the values I, U, or D in the second delimited field.  
I - Insert a new row into the appropriate table in the database.  
U - Change one or more column values for an existing row in one or more tables.  
D - Delete a row from a table(s) for the row containing the key data.

**Business Rules**

Common Rules

1. Action Code is required.  
**Error Messages:**
  1. Action Code is Required.
2. Action Code must be either 'I', 'U', or 'D'..  
**Error Messages:**
  1. Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

**5.1.3 State Code**

**Description:** A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

**Attributes:** Alphanumeric  
2-character code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid FIPS state code in delimited field 3. A code is valid if it exists in the States Table.

**Business Rules**

Common Rules:

1. State Code is mandatory.  
**Error Messages:**
  1. State Code is required.

- 
2. A Site with (State Code, County Code, Site ID) must be in the SITES table

**Error Messages:**

1. Invalid Site..
2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

### 5.1.4 County Code

**Description:** A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

**Attributes:** Alphanumeric  
3-digit code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid county code in the fourth delimited field. A code is valid if it exists in combination with state code and city code, in the County Cities Table.

**Business Rules**Common Rules:

1. County Code is required.

**Error Messages:**

1. County Code is required.
  2. A Site with (State Code, County Code, Site ID) must be in the SITES table
- Error Messages:**
1. Invalid Site..
  2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

### 5.1.5 Site ID

**Description:** A numeric identifier (ID) that uniquely identifies each air monitoring site within a county.

**Attributes:**           Alphanumeric  
                              4-digit ID  
                              Mandatory  
                              Key Field

**Coding Instructions:** Place a four-digit numeric code in the fifth delimited field. For update and delete, a site ID value is valid if it exists in combination with state code and county code in the Sites Table.

#### **Business Rules**

Common Rules:

1. Site ID is mandatory.

**Error Messages:**

1. Site ID is required.
2. Site ID must be exactly 4 digits.  
**Error Messages:**
  1. Invalid Site ID length
3. (State Code, County Code, Site ID) must be in the SITES table.  
**Error Messages:**
  1. Invalid Site..
  2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

### 5.1.6 Parameter

**Description:** The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

**Attributes:**           Alphanumeric  
                          5-digit code  
                          Mandatory  
                          Key Field

**Coding Instructions:** Place a valid parameter code in the sixth delimited field. A parameter value is valid if it exists in combination with state code, county code, site ID, and POC in the Monitors Table.

## **Business Rules**

### Common Rules

1. Parameter Code is Mandatory.

**Error Messages:**

1. Parameter Code is required.
2. Parameter Code must be in PARAMETERS table..  
**Error Messages:**
  1. Integrity constraint (AIRSRAQS.MO\_PA\_FK) violated
3. PARAMETERS (PARAMETER\_CODE) must be at production status.  
**Error Messages:**
  1. Status for PARAMETER\_CODE is inactive.

### Insert Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) cannot be already in the MONITORS table in the database..  
**Error Messages:**
  1. Unique constraint (AIRSRAQS.MO\_MON\_UK) violated.

### Update Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database..  
**Error Messages:**
  1. Monitor ID (State, County, Site, Parameter, POC) not in database.

### Delete Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.  
**Error Messages:**
  1. Monitor ID (State, County, Site, Parameter, POC) not in database.

## **5.1.7 POC (Parameter Occurrence Code)**

**Description:** An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter. For example, the first monitor established to measure CO at a site could have a POC of 1. If an additional monitor were established at the same site to measure CO,

that monitor could have a POC of 2. However, if a new instrument were installed to replace the original instrument used as the first monitor, that would be the same monitor and it would still have a POC of 1.

For criteria pollutants, data from different sampling methods should only be stored under the same POC if the sampling intervals are the same and the methods are reference or equivalent. For sites where duplicate sampling is being conducted by multiple agencies or by one agency with multiple samplers, multiple POCs must be utilized to store all samples.

For non-criteria pollutants, data from multiple sampling methods can be stored under the same POC if the sampling intervals are the same and there is only one sample for the time reported. If multiple open path monitors are reporting data for the same parameter, each open path would be assigned a different POC.

**Attributes:** Numeric  
2-digit ID  
Mandatory  
Key Field

**Coding Instructions:** Place a valid POC value in the seventh delimited field. A POC value is valid if it exists in combination with state code, county code, site ID, and parameter on the Monitors Table.

## Business Rules

### Common Rules

1. POC is Mandatory.

**Error Messages:**

1. POC is required.
2. POC must be a number between 1 and 99..  
**Error Messages:**
  1. Check constraint (AIRSRAQS.AVCON\_632937\_POC\_000) violated.

### Insert Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) cannot be already in the MONITORS table in the database..

**Error Messages:**

1. Unique constraint (AIRSRAQS.MO\_MON\_UK) violated.

### Update Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database..

**Error Messages:**

1. Monitor ID (State, County, Site, Parameter, POC) not in database.

#### Delete Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

#### **Error Messages:**

1. Monitor ID (State, County, Site, Parameter, POC) not in database.

### **5.1.8 Project Class**

**Description:** The type of sampling performed by the monitor.

**Attributes:** Alphanumeric  
2-digit code  
Optional

**Coding Instructions:** Place a valid project class code in the eighth delimited field. A project class value is valid if it exists in the Project Types Table.

#### **Business Rules:**

##### Common Rules

1. Project Class must be in PROJECT\_TYPES table.

#### **Error Messages:**

1. Integrity constraint (AIRSRAQS.MO\_PTY\_FK) violated.
  2. PROJECT\_TYPES (PROJECT\_TYPE\_CODE) must be at production status.
- Error Messages:**
1. Status for PROJECT\_TYPE\_CODE is inactive.

#### Insert Rules

None.

#### Update Rules

None.

#### Delete Rules

None.

### **5.1.9 Dominant Source**

**Description:** The primary source of the pollutant being measured.

**Attributes:** Alphanumeric  
Up to 20 characters  
Optional

**Coding Instructions:** Place a valid dominant source term in the ninth delimited field. A dominant source value is valid if it exists in the Dominant Sources Table.



**Business Rules:**Common Rules

1. Dominant Source must be in DOMINANT\_SOURCES table.  
**Error Messages:**
  1. Integrity constraint (AIRSRAQS.MO\_DS\_FK) violated.
2. DOMINANT\_SOURCES (DOMINANT\_SOURCE) must be at production status.  
**Error Messages:**
  1. Status for DOMINANT\_SOURCE is inactive.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

**5.1.10 Measurement Scale**

**Description:** A denotation of the geographic scope of the air quality measurements made by the monitor. The implication is that the same measurement made elsewhere within the measurement scale would produce an equivalent result to that produced at the monitoring site.

**Attributes:** Alphanumeric  
Up to 20 characters  
Optional

**Coding Instruction:** Place a valid measurement scale term in the tenth delimited field. A measurement scale term is valid if it exists in the Measurement Scales Table.

**Business Rules:**Common Rules

1. Measurement Scale must be in MEASUREMENT\_SCALES table.  
**Error Messages:**
  1. Integrity constraint (AIRSRAQS.MO\_MS\_FK) violated.
2. MEASUREMENT\_SCALES (MEASUREMENT\_SCALE) must be at production status.  
**Error Messages:**
  1. Status for MEASUREMENT\_SCALE is inactive.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

**5.1.11 Open Path Number**

**Description:** The specific open path number registered at the site that the monitoring data and monitor represent. The number must be registered at the site before it can be identified by the monitor.

**Attributes:** Numeric  
2 digits (nn)  
Optional

**Coding Instructions:** Place a valid open path number in the eleventh delimited field. An open path number value is valid if it exists in combination with state code, county code, and site ID on the Open Paths Table.

**Business Rules:**Common Rules

1. Open Path Number must be in OPEN\_PATHS table for the site.

**Error Messages:**

1. Integrity constraint (AIRSRAQS.MO\_OP\_FK) violated.
  2. Open Path Number for Site must be at production status..
- Error Messages:**
1. Open Path is inactive.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

**5.1.12 Probe Location Code**

**Description:** The location of the sampling probe.

**Attributes:** Alphanumeric  
Up to 20 characters  
Optional

**Coding Instructions:** Place a valid probe location term in the twelfth delimited field. A probe location term is valid if it exists in the Probe Locations Table.

**Business Rules:**Common Rules

1. Probe Location Code must be in PROBE\_LOCATIONS table.

**Error Messages:**

1. Integrity constraint (AIRSRAQS.MO\_PL\_FK) violated.
2. PROBE\_LOCATIONS (PROBE\_LOCATION) must be at production status.

**Error Messages:**

1. Status for PROBE\_LOCATION is inactive.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

**5.1.13 Probe Height**

**Description:** The height of the sampling probe from the ground in meters.

**Attributes:** Numeric  
10 digits, including 2 decimal places (nnnnnnnn.nn)  
Optional:  
Required on insert  
Optional on update  
May not be deleted

**Coding Instructions:** Place a valid probe height value in the thirteenth delimited field. A probe height value is valid if it is greater than 0.

**Business Rules:**Common Rules

1. Probe Height must be greater than 0.

**Error Messages:**

1. Check constraint (AIRSRAQS.MO\_POSITIVE\_PROBE\_HT) violated

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 5.1.14 Horizontal Distance

**Description:** The horizontal distance, in meters, of the probe from its supports.

**Attributes:** Numeric  
10 digits, including 2 decimal places (nnnnnnnn.nn)  
Optional:

**Coding Instructions:** Place a valid probe horizontal distance value in the fourteenth delimited field. A horizontal distance value is valid if it is greater than 0.

**Business Rules:**Common Rules

1. Horizontal Distance must be greater than 0.

**Error Messages:**

1. Check constraint (AIRSRAQS.MO\_POSITIVE\_HORIZ\_DIST) violated

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 5.1.15 Vertical Distance

**Description:** The vertical distance, in meters, of the probe from its supports.

**Attributes:** Numeric  
10 digits, including 2 decimal places (nnnnnnnn.nn)  
Optional

**Coding Instructions:** Place a valid probe vertical distance value in the fifteenth delimited field. A vertical distance value is valid if it is greater than 0.

**Business Rules:**Common Rules

1. Vertical Distance must be greater than 0.

**Error Messages:**

1. Check constraint (AIRSRAQS.MO\_POSITIVE\_VERT\_DIST) violated.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

**5.1.16 Surrogate Flag Indicator**

**Description:** Indicates whether a Total Suspended Particulate (TSP) monitor serves as a surrogate monitor for PM-10.

**Attributes:** 1-character code: Y or N  
Optional: (Required for TSP insert. Prohibited if not TSP)

**Coding Instructions:** If parameter is 11101 and the monitor is a surrogate for PM-10, then place the value Y in the sixteenth delimited field.  
If parameter is not 11101, or parameter is 11101, but the monitor is not a surrogate for PM-10, place nothing or N in the sixteenth delimited field.

**Business Rules:**Common Rules

1. Surrogate Flag Indicator may only be valued when Parameter is equal to '11101', which is the code for TSP.

**Error Messages:**

1. Check constraint (AIRSRAQS.MO\_SURROGATE\_INDICATOR) violated
2. Surrogate Flag Indicator must be 'Y' or 'N'.

**Error Messages:**

1. Check constraint (AIRSRAQS.MO\_SURROGATE\_INDICATOR) violated

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

**5.1.17 Unrestricted Air Flow Indicator**

**Description:** Indication of whether the flow of air to the monitor is restricted.

**Attributes:** Alphanumeric  
1-character code: Y, N, or W  
Optional

**Coding Instructions:** Place a valid unrestricted air flow indicator in the seventeenth delimited field. An unrestricted air flow indicator value is valid if it is Y (for yes), N (for no), or W (for waiver).

**Business Rules:**Common Rules

1. Unrestricted Air Flow Indicator must be 'Y', 'N', or 'W'..

**Error Messages:**

1. Check constraint (AIRSRAQS.AVCON\_632937\_UNRES\_000) violated

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 5.1.18 Sample Residence Time

**Description:** The time in seconds for the sample to move from the probe inlet to the monitor.

**Attributes:** Numeric  
10 digits, including 2 decimal places (nnnnnnnn.nn)  
Optional

**Coding Instructions:** Place a valid sample residence time in the eighteenth delimited field. A sample residence time value is valid if it is greater than 0.

**Business Rules:**

There are no business rules for Sample Residence Time.

### 5.1.19 Worst Site Type

**Description:** Within a particular monitoring area, those monitors with the highest PM-10 concentrations must have their worst site type set to 1, and are expected to monitor at the recommended collection frequency. Other monitors must be classified as either not worst site monitors, or monitoring on an accelerated schedule, but not at the recommended collection frequency.

**Attributes:** Alphanumeric  
1-digit code  
Optional: (Required for PM-10 insert, Prohibited if not PM-10)

---

**Coding Instructions:** Place a valid worst site type code in the nineteenth delimited field.

For an insert, a worst site type value is valid if it exists in the Worst Site Types Table and one of the following is populated with a monitoring area code: pollutant area code 1, pollutant area code 2, pollutant area code 3, pollutant area code 4, or pollutant area code 5.

For an update, a worst site type value is valid if it exists in the Worst Site Types Table and one of the following is populated with a monitoring area code: pollutant area code 1, pollutant area code 2, pollutant area code 3, pollutant area code 4, or pollutant area code 5, or there is an existing monitoring area code for the monitor on the Pollutant Area Monitors Table. If either pollutant area code 1, pollutant area code 2, pollutant area code 3, pollutant area code 4, or pollutant area code 5 are populated with a monitoring area code, then worst site type is required.

### **Business Rules:**

#### Common Rules

1. Worst Site Type may only be valued when Pollutant Area Code is a Monitoring Area.

#### **Error Messages:**

1. Check constraint (AIRSRAQS.PAM\_WORST\_SITE\_TYPE\_VALIDATION) violated.
2. Worst Site Type must be in WORST\_SITE\_TYPES table..  
**Error Messages:**
  1. Integrity constraint (AIRSRAQS.PAM\_WST\_FK) violated.
3. WORST\_SITE\_TYPES (WORST\_SITE\_TYPE) must be at production status..  
**Error Messages:**
  1. Status for WORST\_SITE\_TYPE is inactive.

#### Insert Rules

None.

#### Update Rules

None.

#### Delete Rules

None.

### **5.1.20 Applicable NAAQS Indicator**

**Description:** The applicable NAAQS (National Ambient Air Quality Standards) indicator determines whether the data from a monitor in a monitor planning area should be compared to either the short-term or annual NAAQS, or both.

**Attributes:**           Alphanumeric  
                          1-character code  
                          Optional

**Coding Instructions:** Place a valid applicable NAAQS indicator in the twentieth delimited field. An applicable NAAQS indicator value is valid if it is S (for short-term), A (for annual), or B (for both), and one of the following is populated with a monitor planning area code: pollutant area code 1, pollutant area code 2, pollutant area code 3, pollutant area code 4, or pollutant area code 5.

### **Business Rules:**

#### Common Rules

1. Applicable NAAQS Indicator may only be valued when Pollutant Area Code is a Monitor Planning Area.

**Error Messages:**

1. Check constraint (AIRSRAQS.PAM\_APPLICABLE\_NAAQS\_IND) violated.
2. Applicable NAAQS Indicator must be 'S', 'A', or 'B'...

**Error Messages:**

1. Check constraint (AIRSRAQS.AVCON\_638474\_APPLI\_000) violated

#### Insert Rules

None.

#### Update Rules

None.

#### Delete Rules

None.

### **5.1.21 Spatial Average Indicator**

**Description:** Indicates whether spatial averaging is to be performed for the all individual annual weighted means for sites that are flagged and in the same community monitoring zone.

**Attributes:**           Alphanumeric  
                          1-character code  
                          Optional

**Coding Instructions:** Place a valid spatial average indicator in the twenty-first delimited field. A spatial average indicator value is valid if:  
1) it is Y (for yes), or N (for no),  
2) one of the following is populated with a monitor planning area code: pollutant area code 1, pollutant area code 2, pollutant area code 3, pollutant area code 4, or pollutant area code 5, and



3) community monitoring zone is assigned a value.

**Business Rules:**

Common Rules

1. Spatial Average Indicator may only be valued when Pollutant Area Code is a Monitor Planning Area.

**Error Messages:**

1. Check constraint (AIRSRAQS.PAM\_SPATIAL\_AVERAGE\_IND) violated.
2. Spatial Average Indicator must be 'Y' or 'N'..

**Error Messages:**

1. Check constraint (AIRSRAQS.AVCON\_638474\_SPATI\_000) violated

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 5.1.22 Schedule Exemption Indicator

**Description:** Indicates whether the sampling schedule differs from that required by the standard by approval of the Regional Administrator.

**Attributes:** 1-character code: Y or N  
Optional

**Coding Instructions:** Place a valid schedule exemption indicator in the twenty-second delimited field. A schedule exemption indicator value is valid if it is Y (for yes) or N (for no), and one of the following is populated with a monitor planning area code: pollutant area code 1, pollutant area code 2, pollutant area code 3, pollutant area code 4, or pollutant area code 5.

**Business Rules:**

Common Rules

1. Schedule Exemption Indicator may only be valued when Pollutant Area Code is a Monitor Planning Area.

**Error Messages:**

1. Check constraint (AIRSRAQS.PAM\_SCHEDULE\_EXEMPTION\_IND) violated.
2. Schedule Exemption Indicator must be 'Y' or 'N'..

**Error Messages:**

1. Check constraint (AIRSRAQS.AVCON\_638474\_SCHED\_000) violated.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 5.1.23 Community Monitoring Zone

**Description:** A sequential number assigned to an optional averaging area with an established, defined boundary within a monitor planning area that has a relatively uniform concentration of annual PM-2.5. Community monitoring zones do not cross geographical lines.

**Attributes:** Numeric  
4 digits (nnnn)  
Optional

**Coding Instructions:** Place a valid community monitoring zone number in the twenty-third delimited field. A community monitoring zone value is valid if one of the following is populated with a monitor planning area code: pollutant area code 1, pollutant area code 2, pollutant area code 3, pollutant area code 4, or pollutant area code 5.

**Business Rules:**Common Rules

1. Community Monitoring Zone may only be valued when Pollutant Area Code is a Monitor Planning Area.

**Error Messages:**

1. Check constraint (AIRSRAQS.PAM\_COMMUNITY\_MONITORING\_ZONE) violated.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 5.1.24 Pollutant Area Code 1, 2, 3, 4, or 5

**Description:** Designation of pollutant areas to which the monitor is assigned. Using these fields, up to five pollutant areas can be designated for an individual monitor. Pollutant areas are geographic areas defined by a program

office in which a certain pollutant should be closely watched. Most are problem or non-attainment areas, but attainment areas requiring special attention may also be defined. Types of pollutant areas are status areas, monitoring areas, and monitor planning areas.

**Attributes:** Alphanumeric  
5-character code  
Optional

**Coding Instructions:** The transaction format allows the designation of up to five pollutant areas. The delimited fields allocated for these designations are positions 24-28. Assignments should be made in sequence, i.e., do not use position 25, if you have not yet used position 24. Only one pollutant area code for each pollutant area type may be assigned to a single monitor. (It is valid to assign one monitoring area and one status area; it is not valid to assign two monitoring areas.) To insert, place a valid pollutant area code in the next available field (24-28). A pollutant area code value is valid if it exists on the Pollutant Areas Table, and its pollutant area type is valid for the assigned value of parameter.

**Business Rules:**

Common Rules

1. Pollutant Area Code must be in POLLUTANT\_AREAS table.

**Error Messages:**

1. Integrity constraint (AIRSRAQS.PAM\_PAR\_FK) violated

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

## 5.2 Monitor Sampling Periods - Transaction Type MB

See the transaction requirements in the Appendices for a list of transactions required to create sites and monitors. See the data input transaction formats in the Appendices for a list of required fields on each transaction format. For criteria pollutant monitors, transaction types MA through ME are required.

Multiple sampling periods may be registered in the database to allow for definition of periodic monitoring. The edit restrictions prevent more than one sampling period from having a blank date sampling ended.

The fields described below are validated for insert (I) and update (U) transactions.

### Transaction Level Rules and Errors

1. The sampling period cannot be changed (update or delete) in a manner that would exclude existing Raw, Precision, Accuracy, or Summary data from the date range.

#### Error Messages:

1. Raw, precision, or accuracy data exist outside of sample periods.

### 5.2.1 Transaction Type

**Description:** Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

**Attributes:**           Alphanumeric  
                              2-character code  
                              Mandatory

**Coding Instructions:** Place MB in the first delimited field.

#### Business Rules:

##### Common Rules

1. Transaction Type is mandatory

#### Error Messages:

1. Transaction Type is Required.
  2. Transaction Type must be in TRANSACTION\_TYPES table in database.
- #### Error Messages:
1. Invalid Transaction Type.

##### Insert Rules

None.

##### Update Rules

None.

Delete Rules

None.

### 5.2.2 Action Code

**Description:** Indicates the data manipulation action to be performed by the transaction.

**Attributes:** Alphanumeric  
1-character code  
Mandatory

**Coding Instructions:** Place the values I, U, or D in the second delimited field.  
I - Insert a new row into the appropriate table in the database.  
U - Change one or more column values for an existing row in one or more tables.  
D - Delete a row from a table(s) for the row containing the key data.

#### Business Rules

Common Rules

1. Action Code is required.  
**Error Messages:**
  1. Action Code is Required.
2. Action Code must be either 'I', 'U', or 'D'..  
**Error Messages:**
  1. Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 5.2.3 State Code

**Description:** A FIPS code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

**Attributes:** Alphanumeric  
2-character code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid FIPS state code in delimited field 3. A code is valid if it exists in the States Table.

**Business Rules**Common Rules:

1. State Code is mandatory.

**Error Messages:**

1. State Code is required.
2. A Site with (State Code, County Code, Site ID) must be in the SITES table

**Error Messages:**

1. Invalid Site..
2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

**5.2.4 County Code**

**Description:** A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

**Attributes:** Alphanumeric  
3-digit code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid county code in the fourth delimited field. A code is valid if it exists in combination with state code and city code, in the County Cities Table.

**Business Rules**Common Rules:

1. County Code is required.

**Error Messages:**

1. County Code is required.

- 
2. A Site with (State Code, County Code, Site ID) must be in the SITES table

**Error Messages:**

1. Invalid Site..
2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

### 5.2.5 Site ID

**Description:** A numeric identifier (ID) that uniquely identifies each air monitoring site within a county.

**Attributes:**           Alphanumeric  
                              4-digit ID  
                              Mandatory  
                              Key Field

**Coding Instructions:** Place a four-digit numeric code in the fifth delimited field. For update and delete, a site ID value is valid if it exists in combination with State code and county code in the Sites Table.

**Business Rules**Common Rules:

1. Site ID is mandatory.

**Error Messages:**

1. Site ID is required.

2. Site ID must be exactly 4 digits.

**Error Messages:**

1. Invalid Site ID length

3. (State Code, County Code, Site ID) must be in the SITES table.

**Error Messages:**

1. Invalid Site..
2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

### 5.2.6 Parameter

**Description:** The code assigned to the parameter measured by the monitor.  
Parameters may be pollutants or non-pollutants.

**Attributes:** Alphanumeric  
5-digit code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid parameter code in the sixth delimited field. A parameter value is valid if it exists in combination with state code, county code, site ID, and POC in the Monitors Table.

#### Business Rules

Common Rules

1. Parameter Code is Mandatory.

**Error Messages:**

1. Parameter Code is required.
2. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database..

**Error Messages:**

1. Monitor ID (State, County, Site, Parameter, POC) not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 5.2.7 POC (Parameter Occurrence Code)

**Description:** An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter.



**Attributes:**           Numeric  
                          2-digit ID  
                          Mandatory  
                          Key Field

**Coding Instructions:** Place a valid POC value in the seventh delimited field. A POC value is valid if it exists in combination with state code, county code, site ID, and parameter on the Monitors Table.

## **Business Rules**

### Common Rules

1. POC is Mandatory.

**Error Messages:**

1. POC is required.
2. POC must be a number between 1 and 99..  
**Error Messages:**
  1. Check constraint (AIRSRAQS.AVCON\_632937\_POC\_000) violated.
3. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database..  
**Error Messages:**
  1. Monitor ID (State, County, Site, Parameter, POC) not in database.

### Insert Rules

None.

### Update Rules

None.

### Delete Rules

None.

## **5.2.8 Date Sampling Began**

**Description:**           The date on which a distinct period of operations, i.e., collection of air quality samples, began for the monitor.

**Attributes:**           Date  
                          8-digit date  
                          Mandatory  
                          Key Field

**Coding Instructions:** Place a valid date string in the eighth delimited field. A date sampling began value is valid if it: is in the format of YYYYMMDD, does not fall within any other sample periods defined for the monitor, is greater than or equal to the date site established for the corresponding site, and is less than or equal to the date site terminated for the corresponding site, if populated.

**Business Rules:**Common Rules

1. Date Sampling Began is mandatory.

**Error Messages:**

1. Date Sampling Began is required.

Insert Rules

1. Date Sampling Began must not fall within any other Date Sampling Began-Date Sampling Ended range for the same monitor..

**Error Messages:**

1. Date cannot be within an existing date range
2. Date Sampling Begin must be greater than, or equal to, the site's established date, and less than, or equal to, the site's terminated date, if the site has been terminated, or one year from the current date, if the site hasn't been terminated.

**Error Messages:**

1. Samp Beg must be between date Site estab '& term or 1yr from today.

Update Rules

None.

Delete Rules

None.

**5.2.9 Date Sampling Ended**

**Description:** The date on which a distinct period of operations, i.e., collection of air quality samples, stopped for the monitor.

**Attributes:** Date  
8-digit date  
Optional

**Coding Instructions:** Place a valid date string in the ninth delimited field. A date sampling ended value is valid if it: is in the format of YYYYMMDD, is greater than or equal to the specified date sampling began, does not fall within any other sample periods defined for the monitor, is greater than or equal to the date site established for the corresponding site, and is less than or equal to the date site terminated for the corresponding site, if populated..

**Business Rules:**Common Rules

1. Date Sampling Ended must be greater than Date Sampling Began.

**Error Messages:**

1. The end date must be greater than the start date.
2. Date Sampling Ended must be less than, or equal to, the site's terminated date, if the site has been terminated, or one year from the current date, if the site hasn't been terminated.

**Error Messages:**

1. Date Sampling Ended must be between date Site estab '& term or 1yr from today.
3. Date Sampling Ended must not fall within any other Date Sampling Began-Date Sampling Ended range for the same monitor .

**Error Messages:**

1. Date cannot be within an existing date range.
4. Date Sampling Ended must not exclude (orphan) any Raw, Precision, Accuracy, or Summary data that has been loaded for the monitor . (I.e. There cannot be any data loaded for the monitor after the Date Sampling Ended.)

**Error Messages:**

1. Date Sampling Ended will orphan data for monitor.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

## 5.3 Monitor Type Information - Transaction Type MC

See the transaction requirements in the Appendices for a list of transactions required to create sites and monitors. See the data input transaction formats in the Appendices for a list of required fields on each transaction format. For criteria pollutant monitors, transaction types MA through ME are required.

### Transaction Level Rules and Errors

1. The monitor type assignment cannot be changed (update or delete) in a manner that would exclude existing Raw, Precision, Accuracy, or Summary data from the date range.

#### Error Messages:

1. Raw, precision, or accuracy data exist outside of monitor type assignment periods.

The fields described below are validated for insert (I) and update (U) transactions.

### 5.3.1 Transaction Type

**Description:** Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

**Attributes:** Alphanumeric  
2-character code  
Mandatory

**Coding Instructions:** Place MC in the first delimited field.

#### Business Rules:

##### Common Rules

1. Transaction Type is mandatory  
**Error Messages:**
  1. Transaction Type is Required.
2. Transaction Type must be in TRANSACTION\_TYPES table in database.  
**Error Messages:**
  1. Invalid Transaction Type.

##### Insert Rules

None.

##### Update Rules

None.

##### Delete Rules

None.

### 5.3.2 Action Code

**Description:** Indicates the data manipulation action to be performed by the transaction.

**Attributes:** Alphanumeric  
1-character code  
Mandatory

**Coding Instructions:** Place the values I, U, or D in the second delimited field.  
I - Insert a new row into the appropriate table in the database.  
U - Change one or more column values for an existing row in one or more tables.  
D - Delete a row from a table(s) for the row containing the key data.

#### Business Rules

##### Common Rules

1. Action Code is required.  
**Error Messages:**
  1. Action Code is Required.
2. Action Code must be either 'I', 'U', or 'D'..  
**Error Messages:**
  1. Invalid Action Code.

##### Insert Rules

None.

##### Update Rules

None.

##### Delete Rules

None.

### 5.3.3 State Code

**Description:** A FIPS code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

**Attributes:** Alphanumeric  
2-character code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid FIPS state code in delimited field 3. A code is valid if it exists in the States Table.

**Business Rules**Common Rules:

1. State Code is mandatory.  
**Error Messages:**
  1. State Code is required.
2. A Site with (State Code, County Code, Site ID) must be in the SITES table  
**Error Messages:**
  1. Invalid Site..
  2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

**5.3.4 County Code**

**Description:** A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

**Attributes:** Alphanumeric  
3-digit code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid county code in the fourth delimited field. A code is valid if it exists in combination with state code and city code, in the County Cities Table.

**Business Rules**Common Rules:

1. County Code is required.  
**Error Messages:**
  1. County Code is required.
2. A Site with (State Code, County Code, Site ID) must be in the SITES table  
**Error Messages:**
  1. Invalid Site..
  2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

### 5.3.5 Site ID

**Description:** A numeric identifier (ID) that uniquely identifies each air monitoring site within a county.

**Attributes:**           Alphanumeric  
                              4-digit ID  
                              Mandatory  
                              Key Field

**Coding Instructions:** Place a four-digit numeric code in the fifth delimited field. For update and delete, a site ID value is valid if it exists in combination with state code and county code in the Sites Table.

**Business Rules**Common Rules:

1. Site ID is mandatory.

**Error Messages:**

1. Site ID is required.

2. Site ID must be exactly 4 digits.

**Error Messages:**

1. Invalid Site ID length

3. (State Code, County Code, Site ID) must be in the SITES table.

**Error Messages:**

1. Invalid Site..
2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

### 5.3.6 Parameter

**Description:** The code assigned to the parameter measured by the monitor.  
Parameters may be pollutants or non-pollutants.

**Attributes:** Alphanumeric  
5-digit code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid parameter code in the sixth delimited field. A parameter value is valid if it exists in combination with state code, county code, site ID, and POC in the Monitors Table.

#### Business Rules

##### Common Rules

1. Parameter Code is Mandatory.

**Error Messages:**

1. Parameter Code is required.
2. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database..

**Error Messages:**

1. Monitor ID (State, County, Site, Parameter, POC) not in database.

##### Insert Rules

None.

##### Update Rules

None.

##### Delete Rules

None.

### 5.3.7 POC (Parameter Occurrence Code)

**Description:** An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter.

**Attributes:** Numeric  
2-digit ID  
Mandatory  
Key Field

**Coding Instructions:** Place a valid POC value in the seventh delimited field. A POC value is valid if it exists in combination with state code, county code, site ID, and parameter on the Monitors Table.



**Business Rules**Common Rules

1. POC is Mandatory.  
**Error Messages:**
  1. POC is required.
2. POC must be a number between 1 and 99..  
**Error Messages:**
  1. Check constraint (AIRSRAQS.AVCON\_632937\_POC\_000) violated.
3. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database..  
**Error Messages:**
  1. Monitor ID (State, County, Site, Parameter, POC) not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

**5.3.8 Monitor Type**

**Description:** The monitor's administrative classification.

**Attributes:** Alphanumeric  
20-character code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid monitor type term in the eighth delimited field. A monitor type value is valid if it exists in the Monitor Types Table.

**Business Rules:**Common Rules

1. Monitor Type is mandatory.  
**Error Messages:**
  1. Monitor Type is required.
2. Monitor Type must be in MONITOR\_TYPES table.  
**Error Messages:**
  1. Integrity constraint (AIRSRAQS.MTA\_MT\_FK) violated.

3. Monitor Type must be at production status.  
**Error Messages:**
  1. Monitor Type is inactive.
4. User must have EPA\_HQ application role to assign PAMS monitor type..  
**Error Messages:**
  1. Insufficient privileges for specified monitor type.

#### Insert Rules

1. The combination of Monitor\_Type and Monitor Type Begin Date must not already be in MONITOR\_TYPES table for monitor..  
**Error Messages:**
  1. Unique constraint (AIRSRAQS.MTA\_MONTYPASG1\_UK) violated.

#### Update Rules

None.

#### Delete Rules

None.

### 5.3.9 Monitor Type Begin Date

**Description:** The date on which the monitor type assignment went into effect.

**Attributes:** Date  
8-digit date  
Mandatory  
Key Field

**Coding Instructions:** Place a valid date string in the ninth delimited field. A monitor type begin date value is valid if it: is in the format of YYYYMMDD, the monitor type is National Air Monitoring System (NAMS) or State and Local Air Monitoring System (SLAMS) and is between January 1, 1980 and one year from the current date, the monitor type is not NAMS or SLAMS and is between January 1, 1957 and one year from the current date, does not fall within any other monitor type assignment periods defined for the monitor for the same monitor type, and falls within a sample period for the monitor.

#### **Business Rules:**

##### Common Rules

1. Monitor Type Begin Date is mandatory.  
**Error Messages:**
  1. Monitor Type Begin Date is required.

2. If Monitor Type is 'NAMS' or 'SLAMS', then Monitor Type Begin Date must greater than, or equal to, 1/1/1980.

**Error Messages:**

1. The NAMS AND SLAMS monitor\_type\_begin\_date must be between a valid range > 01-JAN-1980.
3. Monitor Type Begin Date must be less than one year from the current date..  
**Error Messages:**
    1. Begin Date must be within sampling period or today plus 1 year.
  4. Monitor Type Begin Date must fall within a sampling period of the monitor..  
**Error Messages:**
    1. Monitor\_type\_begin\_date not within valid sampl period.
  5. Monitor Type Begin Date must not fall within any other Monitor Type Begin Date-Monitor Type End Date range for the same monitor and type  
**Error Messages:**
    1. Date cannot be within an existing date range

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 5.3.10 Monitor Type End Date

**Description:** The date on which a monitor type assignment ends.

**Attributes:** Date  
8-digit date  
Optional

**Coding Instructions:** Place a valid date string in the tenth delimited field. A monitor type end date value is valid if it: is in the format of YYYYMMDD, is greater than the monitor type begin date, the monitor type is National Air Monitoring System (NAMS) or State and Local Air Monitoring System (SLAMS) and is between January 1, 1980 and one year from the current date, the monitor type is not NAMS or SLAMS and is between January 1, 1957 and one year from the current date, does not fall within any other monitor type assignment periods defined for the monitor for the same monitor type, and falls within a sample period for the monitor. Multiple monitor type designations with a blank monitor type end date are valid. By definition, a NAMS is also a SLAMS, and a

Photochemical Assessment Monitoring System (PAMS) can also be a NAMS or SLAMS.

**Business Rules:**Common Rules

1. Monitor Type End Date must be greater than, or equal to, Monitor Type Begin Date..  
**Error Messages:**
  1. The end date must be greater than the start date.
2. Monitor Type End Date must fall within a valid sampling period..  
**Error Messages:**
  1. End Date must be within sampling period or today plus 1 year
3. Monitor Type End Date must not fall within any other Monitor Type Begin Date-Monitor Type End Date range for the same monitor and type .  
**Error Messages:**
  1. Date cannot be within an existing date range
4. Monitor Type End Date must not exclude (orphan) any Raw, Precision, Accuracy, or Summary data that has been loaded for the monitor . (I.e. There cannot be any data loaded for the monitor after the Monitor Type End Date.)  
**Error Messages:**
  1. Monitor Type End Date will orphan data for monitor.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

## 5.4 Monitor Agency Role - Transaction Type MD

See the transaction requirements in the Appendices for a list of transactions required to create sites and monitors. See the data input transaction formats in the Appendices for a list of required fields on each transaction format. For criteria pollutant monitors, transaction types MA through ME are required.

### Transaction Level Rules and Errors

1. The Reporting Organization assignment cannot be changed (update or delete) in a manner that would exclude existing Raw, Precision, Accuracy, or Summary data from the date range.

**Error Messages:**

1. Raw, precision, or accuracy data exists outside of reporting organization periods.

The fields described below are validated for insert (I) and update (U) transactions.

#### 5.4.1 Transaction Type

**Description:** Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

**Attributes:** Alphanumeric  
2-character code  
Mandatory

**Coding Instructions:** Place MD in the first delimited field.

**Business Rules:**

Common Rules

1. Transaction Type is mandatory

**Error Messages:**

1. Transaction Type is Required.
2. Transaction Type must be in TRANSACTION\_TYPES table in database.

**Error Messages:**

1. Invalid Transaction Type.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 5.4.2 Action Code

**Description:** Indicates the data manipulation action to be performed by the transaction.

**Attributes:** Alphanumeric  
1-character code  
Mandatory

**Coding Instructions:** Place the values I, U, or D in the second delimited field.  
I - Insert a new row into the appropriate table in the database.  
U - Change one or more column values for an existing row in one or more tables.  
D - Delete a row from a table(s) for the row containing the key data.

#### Business Rules

##### Common Rules

1. Action Code is required.  
**Error Messages:**
  1. Action Code is Required.
2. Action Code must be either 'I', 'U', or 'D'..  
**Error Messages:**
  1. Invalid Action Code.

##### Insert Rules

None.

##### Update Rules

None.

##### Delete Rules

None.

### 5.4.3 State Code

**Description:** A FIPS code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

**Attributes:** Alphanumeric  
2-character code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid FIPS state code in delimited field 3. A code is valid if it exists in the States Table.

**Business Rules**Common Rules:

1. State Code is mandatory.  
**Error Messages:**
  1. State Code is required.
2. A Site with (State Code, County Code, Site ID) must be in the SITES table  
**Error Messages:**
  1. Invalid Site..
  2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

**5.4.4 County Code**

**Description:** A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

**Attributes:** Alphanumeric  
3-digit code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid county code in the fourth delimited field. A code is valid if it exists in combination with state code and city code, in the County Cities Table.

**Business Rules**Common Rules:

1. County Code is required.  
**Error Messages:**
  1. County Code is required.
2. A Site with (State Code, County Code, Site ID) must be in the SITES table  
**Error Messages:**
  1. Invalid Site..
  2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

### 5.4.5 Site ID

**Description:** A numeric identifier (ID) that uniquely identifies each air monitoring site within a county.

**Attributes:**           Alphanumeric  
                              4-digit ID  
                              Mandatory  
                              Key Field

**Coding Instructions:** Place a four-digit numeric code in the fifth delimited field. For update and delete, a site ID value is valid if it exists in combination with State code and county code in the Sites Table.

**Business Rules**Common Rules:

1. Site ID is mandatory.

**Error Messages:**

1. Site ID is required.

2. Site ID must be exactly 4 digits.

**Error Messages:**

1. Invalid Site ID length

3. (State Code, County Code, Site ID) must be in the SITES table.

**Error Messages:**

1. Invalid Site..
2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.



### 5.4.6 Parameter

**Description:** The code assigned to the parameter measured by the monitor.  
Parameters may be pollutants or non-pollutants.

**Attributes:** Alphanumeric  
5-digit code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid parameter code in the sixth delimited field. A parameter value is valid if it exists in combination with state code, county code, site ID, and POC in the Monitors Table.

#### Business Rules

##### Common Rules

1. Parameter Code is Mandatory.

**Error Messages:**

1. Parameter Code is required.
2. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database..

**Error Messages:**

1. Monitor ID (State, County, Site, Parameter, POC) not in database.

##### Insert Rules

None.

##### Update Rules

None.

##### Delete Rules

None.

### 5.4.7 POC (Parameter Occurrence Code)

**Description:** An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter.

**Attributes:** Numeric  
2-digit ID  
Mandatory  
Key Field

**Coding Instructions:** Place a valid POC value in the seventh delimited field. A POC value is valid if it exists in combination with state code, county code, site ID, and parameter on the Monitors Table.

**Business Rules**Common Rules

1. POC is Mandatory.

**Error Messages:**

1. POC is required.
2. POC must be a number between 1 and 99..  
**Error Messages:**
  1. Check constraint (AIRSRAQS.AVCON\_632937\_POC\_000) violated.
3. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database..  
**Error Messages:**
  1. Monitor ID (State, County, Site, Parameter, POC) not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

**5.4.8 Agency Role Name**

**Description:** Classification of an agency's role in regard to the monitor.

**Attributes:** Alphanumeric  
20 characters  
Mandatory  
Key Field

**Coding Instructions:** Place a valid agency role term in the eighth delimited field. A role name value is valid if it exists in the Agency Roles Table with the role type of monitor. Multiple agency role names with the same value cannot be entered for the same period. If the agency changes for any role, the begin and end dates are used to define the applicable time period.

**Business Rules:**Common Rules

1. Agency Role Name must be in ROLES table.

**Error Messages:**

1. Integrity constraint (AIRSRAQS.AR1\_ROL\_FK) violated.

2. ROLES (ROLE) must be at production status..

**Error Messages:**

1. Status for ROLE is inactive.

3. Agency Role Name is mandatory.

**Error Messages:**

1. Agency Role Name is required.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 5.4.9 Agency Code

**Description:** Identification of an agency responsible for performing a role for the monitor.

**Attributes:**           Alphanumeric  
                          4-digit code  
                          Mandatory  
                          Key Field

**Coding Instructions:** To insert or update, place a valid agency code in the ninth delimited field. An agency code value is valid if it exists in combination with the state code value in the State Agencies Table.

**Business Rules:**Common Rules

1. Agency Code is mandatory.

**Error Messages:**

1. Agency Code is required.

2. (State Code, Agency Code) must be in STATE\_AGENCIES table..

**Error Messages:**

1. Integrity constraint (AIRSRAQS.AR1\_SA\_FK) violated.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 5.4.10 Begin Date

**Description:** The date on which the agency began performance of the role for the monitor. For the role of reporting, it also indicates the date that precision and accuracy data applies to the agency as reporting organization.

**Attributes:** Date  
8-digit date  
Key Field  
Mandatory

**Coding Instructions:** For the role of reporting, begin date is required. Place a valid date string in the tenth delimited field. A begin date value is valid if it: is in the format of YYYYMMDD, does not fall within any other agency role periods defined for the monitor for the same role name, and falls within a sample period for the monitor.

**Business Rules:**Common Rules

1. Begin Date is required if Agency Role Name is 'REPORTING'; otherwise, it is optional.

**Error Messages:**

1. Begin Date must be specified for Reporting roles.
  2. Agency Role Begin Date must fall within a valid sample period.
- Error Messages:**
1. Agency Role Begin Date must fall within a valid sample period.

Insert Rules

1. Begin Date must not fall within any other Begin Date-End Date range for the same monitor and role .

**Error Messages:**

1. Date cannot be within an existing date range.

Update Rules

None.

Delete Rules

None.

### 5.4.11 End Date

**Description:** The date on which the agency ended a period of performance of the role for the monitor. For the role of reporting, it also indicates the last date that precision and accuracy data applies to the agency as reporting organization.

**Attributes:** Date  
8-digit date  
Mandatory

**Coding Instructions:** Place a valid date string in the tenth delimited field. An end date value is valid if it: is in the format of YYYYMMDD, is greater than the begin date, does not fall within any other agency role periods defined for the monitor for the same role name, and falls within a sample period for the monitor.

#### **Business Rules:**

##### Common Rules

1. End Date may only be valued if Begin Date is valued, and must be greater than, or equal to, Begin Date.

##### **Error Messages:**

1. Check constraint (AIRSRAQS.AR1\_END\_DATE) violated.
2. End Date must not fall within any other Begin Date-End Date range for the same monitor and role .

##### **Error Messages:**

1. Date cannot be within an existing date range
3. End date must fall in a valid sampling period..

##### **Error Messages:**

1. End date must fall in a valid sampling period..
4. End Date must not exclude (orphan) any Raw, Precision, Accuracy, or Summary data that has been loaded for the monitor . (I.e. There cannot be any data loaded for the monitor after the End Date.)

##### **Error Messages:**

1. End Date will orphan data for monitor.

##### Insert Rules

None.

##### Update Rules

None.

##### Delete Rules

None.

---

## 5.5 Monitoring Objective Information - Transaction Type ME

See the transaction requirements in the Appendices for a list of transactions required to create sites and monitors. See the data input transaction formats in the Appendices for a list of required fields on each transaction format. For criteria pollutant monitors, transaction types MA through ME are required.

The fields described below are validated for insert (I) and update (U) transactions.

### 5.5.1 Transaction Type

**Description:** Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

**Attributes:** Alphanumeric  
2-character code  
Mandatory

**Coding Instructions:** Place ME in the first delimited field.

#### Business Rules:

##### Common Rules

1. Transaction Type is mandatory  
**Error Messages:**
  1. Transaction Type is Required.
2. Transaction Type must be in TRANSACTION\_TYPES table in database.  
**Error Messages:**
  1. Invalid Transaction Type.

##### Insert Rules

None.

##### Update Rules

None.

##### Delete Rules

None.

### 5.5.2 Action Code

**Description:** Indicates the data manipulation action to be performed by the transaction.

**Attributes:**           Alphanumeric  
                          1-character code  
                          Mandatory

**Coding Instructions:** Place the values I, U, or D in the second delimited field.  
I - Insert a new row into the appropriate table in the database.  
U - Change one or more column values for an existing row in one or more tables.  
D - Delete a row from a table(s) for the row containing the key data.

### **Business Rules**

#### Common Rules

1.     Action Code is required.  
      **Error Messages:**
  1.     Action Code is Required.
2.     Action Code must be either 'I', 'U', or 'D'..  
      **Error Messages:**
  1.     Invalid Action Code.

#### Insert Rules

None.

#### Update Rules

None.

#### Delete Rules

None.

### **5.5.3 State Code**

**Description:**       A FIPS code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

**Attributes:**       Alphanumeric  
                          2-character code  
                          Mandatory  
                          Key Field

**Coding Instructions:** Place a valid FIPS state code in delimited field 3. A code is valid if it exists in the States Table.

### **Business Rules**

#### Common Rules:

1.     State Code is mandatory.  
      **Error Messages:**
  1.     State Code is required.

2. A Site with (State Code, County Code, Site ID) must be in the SITES table

**Error Messages:**

1. Invalid Site..
2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

### 5.5.4 County Code

**Description:** A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

**Attributes:** Alphanumeric  
3-digit code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid county code in the fourth delimited field. A code is valid if it exists in combination with state code and city code, in the County Cities Table.

#### Business Rules

Common Rules:

1. County Code is required.

**Error Messages:**

1. County Code is required.
  2. A Site with (State Code, County Code, Site ID) must be in the SITES table
- Error Messages:**
1. Invalid Site..
  2. No data found.

Insert Rules:

None.

Update Rules:

None.



Delete Rules:

None.

### 5.5.5 Site ID

**Description:** A numeric identifier (ID) that uniquely identifies each air monitoring site within a county.

**Attributes:** Alphanumeric  
4-digit ID  
Mandatory  
Key Field

**Coding Instructions:** Place a four-digit numeric code in the fifth delimited field. For update and delete, a site ID value is valid if it exists in combination with state code and county code in the Sites Table.

#### Business Rules

Common Rules:

1. Site ID is mandatory.

**Error Messages:**

1. Site ID is required.

2. Site ID must be exactly 4 digits.

**Error Messages:**

1. Invalid Site ID length

3. (State Code, County Code, Site ID) must be in the SITES table.

**Error Messages:**

1. Invalid Site..
2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

### 5.5.6 Parameter

**Description:** The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

**Attributes:**           Alphanumeric  
                          5-digit code  
                          Mandatory  
                          Key Field

**Coding Instructions:** Place a valid parameter code in the sixth delimited field. A parameter value is valid if it exists in combination with state code, county code, site ID, and POC in the Monitors Table.

## **Business Rules**

### Common Rules

1. Parameter Code is Mandatory.

**Error Messages:**

1. Parameter Code is required.
2. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database..

**Error Messages:**

1. Monitor ID (State, County, Site, Parameter, POC) not in database.

### Insert Rules

None.

### Update Rules

None.

### Delete Rules

None.

## **5.5.7 POC (Parameter Occurrence Code)**

**Description:**           An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter.

**Attributes:**           Numeric  
                          2-digit ID  
                          Mandatory  
                          Key Field

**Coding Instructions:** Place a valid POC value in the seventh delimited field. A POC value is valid if it exists in combination with state code, county code, site ID, and parameter on the Monitors Table.

**Business Rules**Common Rules

1. POC is Mandatory.  
**Error Messages:**
  1. POC is required.
2. POC must be a number between 1 and 99..  
**Error Messages:**
  1. Check constraint (AIRSRAQS.AVCON\_632937\_POC\_000) violated.
3. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database..  
**Error Messages:**
  1. Monitor ID (State, County, Site, Parameter, POC) not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

**5.5.8 Monitor Objective**

**Description:** Identification of the reason for measuring air quality by the monitor.

**Attributes:** Alphanumeric  
Up to 50 characters  
Mandatory  
Key Field

**Coding Instructions:** Place a valid monitor objective term in the eighth delimited field. A monitor objective value is valid if it exists in the Monitor Objective Types Table. Multiple monitor objectives, applying to one or more geographical areas, may be specified.

**Business Rules:**Common Rules

1. Monitor Objective is required..  
**Error Messages:**
  1. Monitor Objective is required.
2. Monitor Objective must be in MONITOR\_OBJECTIVE\_TYPES table..  
**Error Messages:**
  1. Integrity constraint (AIRSRAQS.MOB\_MOT\_FK) violated.

3. Monitor Objective must be at production status.

**Error Messages:**

1. Status for MONITOR\_OBJ\_TYPE is inactive.

Insert Rules

1. Monitor Objective must not already be in database for monitor..

**Error Messages:**

1. Unique constraint (AIRSRAQS.MOB\_MONOBJ1\_UK) violated.

Update Rules

None.

Delete Rules

None.

### 5.5.9 Urban Area Represented

**Description:** The urbanized area from which the concentrations originated (not the location of the monitor).

**Attributes:** Alphanumeric  
4-digit code  
Optional:  
Required on insert  
Optional on update  
May not be deleted

**Coding Instructions:** It is required to designate the origin of concentrations that apply to a monitor objective classification. One, and only one, of urban area represented, Metropolitan Statistical Area (MSA) represented, or Consolidated Metropolitan Statistical Area (CMSA) represented may be used to indicate the designation. Place a valid urban area represented code in the ninth delimited field. An urban area represented value is valid if it exists in the Urbanized Areas Table.

**Business Rules:**

Common Rules

1. Urban Area Represented must be valued if both MSA Represented and CMSA Represented are not valued, and it must not be valued if either of the other two are valued.

**Error Messages:**

1. Check constraint (AIRSRAQS.MOB\_ARC) violated.

2. Urban Area Represented must be in URBANIZED\_AREAS table.

**Error Messages:**

1. Integrity constraint (AIRSRAQS.MOB\_UA\_FK) violated.

3. URBANIZED\_AREAS (UAR\_CODE) must be at production status.

**Error Messages:**

1. Status for UAR\_CODE is inactive

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 5.5.10 MSA Represented

**Description:** The Metropolitan Statistical Area (MSA) from which the concentrations originated, not the location of the monitor.

**Attributes:**           Alphanumeric  
                              4-digit code  
                              Optional

**Coding Instructions:** It is required to designate the origin of concentrations that apply to a monitor objective classification. One, and only one, of urban area represented, MSA represented, or CMSA represented may be used to indicate the designation. Place a valid MSA represented code in the tenth delimited field. An MSA represented value is valid if it exists in the MSAs Table.

**Business Rules:**

Common Rules

1. MSA Represented must be valued if both Urban Area Represented and CMSA Represented are not valued, and it must not be valued if either of the other two are valued.

**Error Messages:**

1. Check constraint (AIRSRAQS.MOB\_ARC) violated

2. MSA Represented must be in MSAS table.

**Error Messages:**

1. Integrity constraint (AIRSRAQS.MOB\_MSA\_FK) violated.

3. MSAS (MSA\_CODE) must be at production status.

**Error Messages:**

1. Status for MSA\_CODE is inactive

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 5.5.11 CMSA Represented

**Description:** The Consolidated Metropolitan Statistical Area (CMSA) from which the concentrations originated, not the location of the monitor.

**Attributes:** Alphanumeric  
2-digit code  
Optional

**Coding Instructions:** It is required to designate the origin of concentrations that apply to a monitor objective classification. One, and only one, of urban area represented, MSA represented, or CMSA represented may be used to indicate the designation. Place a valid CMSA represented code in the eleventh delimited field. A CMSA represented value is valid if it exists in the CMSAs Table.

**Business Rules:**Common Rules

1. CMSA Represented must be valued if both MSA Represented and Urban Area Represented are not valued, and it must not be valued if either of the other two are valued.

**Error Messages:**

1. Check constraint (AIRSRAQS.MOB\_ARC) violated.
2. CMSA Represented must be in CMSAS table.  
**Error Messages:**
  1. Integrity constraint (AIRSRAQS.MOB\_CMSA\_FK) violated.
3. CMSAS (CMSA\_CODE) must be at production status..  
**Error Messages:**
  1. Status for CMSA\_CODE is inactive.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

## 5.6 Monitor Sampling Schedule - Transaction Type MF

See the transaction requirements in the Appendices for a list of transactions required to create sites and monitors. See the data input transaction formats in the Appendices for a list of required fields on each transaction format. For criteria pollutant monitors, transaction types MA through ME are required.

### Transaction Level Rules and Messages

1. Monitor Sampling Schedule is required for PAMS and PM monitors.

**Error Messages:**

No error message is generated, but the monitor will not post to production status until this information is entered.

2. The Required Collection Frequency assignment cannot be changed (update or delete) in a manner that would exclude existing Raw, Precision, Accuracy, or Summary data from the date range.

**Error Messages:**

1. Required Collection Frequency data cannot be updated. Raw Data exists that would be effected by this change.

The fields described below are validated for insert (I) and update (U) transactions.

### 5.6.1 Transaction Type

**Description:** Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

**Attributes:** Alphanumeric  
2-character code  
Mandatory

**Coding Instructions:** Place MF in the first delimited field.

**Business Rules:**

Common Rules

1. Transaction Type is mandatory

**Error Messages:**

1. Transaction Type is Required.

2. Transaction Type must be in TRANSACTION\_TYPES table in database.

**Error Messages:**

1. Invalid Transaction Type.

Insert Rules

None.



Update Rules

None.

Delete Rules

None.

### 5.6.2 Action Code

**Description:** Indicates the data manipulation action to be performed by the transaction.

**Attributes:** Alphanumeric  
1-character code  
Mandatory

**Coding Instructions:** Place the values I, U, or D in the second delimited field.  
I - Insert a new row into the appropriate table in the database.  
U - Change one or more column values for an existing row in one or more tables.  
D - Delete a row from a table(s) for the row containing the key data.

### Business Rules

Common Rules

1. Action Code is required.

**Error Messages:**

1. Action Code is Required.
2. Action Code must be either 'I', 'U', or 'D'..

**Error Messages:**

1. Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 5.6.3 State Code

**Description:** A FIPS code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

**Attributes:** Alphanumeric  
2-character code  
Mandatory

Key Field

**Coding Instructions:** Place a valid FIPS state code in delimited field 3. A code is valid if it exists in the States Table.

**Business Rules**

Common Rules:

1. State Code is mandatory.

**Error Messages:**

1. State Code is required.
2. A Site with (State Code, County Code, Site ID) must be in the SITES table  
**Error Messages:**
  1. Invalid Site..
  2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

### 5.6.4 County Code

**Description:** A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

**Attributes:** Alphanumeric  
3-digit code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid county code in the fourth delimited field. A code is valid if it exists in combination with state code and city code, in the County Cities Table.

**Business Rules**

Common Rules:

1. County Code is required.

**Error Messages:**

1. County Code is required.

- 
2. A Site with (State Code, County Code, Site ID) must be in the SITES table

**Error Messages:**

1. Invalid Site..
2. No data found.

**Insert Rules:**

None.

**Update Rules:**

None.

**Delete Rules:**

None.

### 5.6.5 Site ID

**Description:** A numeric identifier (ID) that uniquely identifies each air monitoring site within a county.

**Attributes:**           Alphanumeric  
                              4-digit ID  
                              Mandatory  
                              Key Field

**Coding Instructions:** Place a four-digit numeric code in the fifth delimited field. For update and delete, a site ID value is valid if it exists in combination with state code and county code in the Sites Table.

**Business Rules****Common Rules:**

1. Site ID is mandatory.

**Error Messages:**

1. Site ID is required.

2. Site ID must be exactly 4 digits.

**Error Messages:**

1. Invalid Site ID length

3. (State Code, County Code, Site ID) must be in the SITES table.

**Error Messages:**

1. Invalid Site..
2. No data found.

**Insert Rules:**

None.

Update Rules:

None.

Delete Rules:

None.

### 5.6.6 Parameter

**Description:** The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

**Attributes:** Alphanumeric  
5-digit code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid parameter code in the sixth delimited field. A parameter value is valid if it exists in combination with state code, county code, site ID, and POC in the Monitors Table.

#### Business Rules

Common Rules

1. Parameter Code is Mandatory.

**Error Messages:**

1. Parameter Code is required.
2. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database..

**Error Messages:**

1. Monitor ID (State, County, Site, Parameter, POC) not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 5.6.7 POC (Parameter Occurrence Code)

**Description:** An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter.

**Attributes:** Numeric  
2-digit ID  
Mandatory  
Key Field

**Coding Instructions:** Place a valid POC value in the seventh delimited field. A POC value is valid if it exists in combination with state code, county code, site ID, and parameter on the Monitors Table.

## Business Rules

### Common Rules

1. POC is Mandatory.

**Error Messages:**

1. POC is required.
2. POC must be a number between 1 and 99..  
**Error Messages:**
  1. Check constraint (AIRSRAQS.AVCON\_632937\_POC\_000) violated.
3. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database..  
**Error Messages:**
  1. Monitor ID (State, County, Site, Parameter, POC) not in database.

### Insert Rules

None.

### Update Rules

None.

### Delete Rules

None.

## 5.6.8 RCF Code

**Description:** The required collection frequency (RCF) is mandatory for both Photochemical Assessment Monitoring System (PAMS) regulations for organic compounds and PM-2.5 or PM-10 monitors.

**Attributes:** Alphanumeric  
1- or 2-character code  
Mandatory for certain monitors, prohibited for others.  
Key Field

**Coding Instructions:** Place a valid RCF code in the eighth delimited field. A RCF code value is valid if it exists in the Collection Frequencies Table.

**Business Rules:****Common Rules**

1. RCF Code is required.  
**Error Messages:**
  1. RCF Code is required.
2. RCF Code must be in COLLECTION\_FREQUENCIES table.  
**Error Messages:**
  1. Integrity constraint (AIRSRAQS.RCF\_CF\_FK) violated.
3. COLLECTION\_FREQUENCIES (COLL\_FREQ\_CODE) must be at production status.  
**Error Messages:**
  1. Status for COLL\_FREQ\_CODE is inactive.
4. RCF Code may not be a PAMS collection frequency if Parameter is '81102' or '88101'.  
**Error Messages:**
  1. PAMS COLLECTION FREQUENCY MAY NOT BE ASSIGNED TO A PM MONITOR.
5. RCF Code must be '1', '3', '6', '8', '9', or 'S' if Parameter is '81102'.  
**Error Messages:**
  1. PM2.5 may only have required collection frequencies of 1, 3, 6, 8, 9, or S.

**Insert Rules**

None.

**Update Rules**

None.

**Delete Rules**

None.

**5.6.9 RCF Begin Date**

**Description:** The date on which the required collection frequency (RCF) went into effect.

**Attributes:** Date  
8-digit date  
Mandatory:  
Key Field

**Coding Instructions:** Place a valid date string in the ninth delimited field. An RCF begin date value is valid if it: is in the format of YYYYMMDD, is between July 1, 1987 and one year from the current date, does not fall within any other required collection frequency periods defined for the monitor, and falls within a sample period for the monitor. The RCF begin date cannot be

changed via update.

## **Business Rules:**

### Common Rules

1. RCF Begin Date is required..

#### **Error Messages:**

1. RCF Begin Date is Required.

2. RCF Begin Date must be greater than, or equal to, July 1, 1987..

#### **Error Messages:**

1. RCF Begin Date must be greater than, or equal to, July 1, 1987.

3. RCF Begin Date must fall within a sample period for the monitor .

#### **Error Messages:**

1. RCF Begin Date must fall within a sample period for the monitor

4. RCF Begin Date must not be greater than one year from the current date.

#### **Error Messages:**

1. Begin Date must be within sampling period or today plus 1 year

5. RCF Begin Date must not fall within any other RCF Begin Date-RCF End Date range for the same monitor (State Code, County Code, Site ID, Parameter, POC).

#### **Error Messages:**

1. More than one RCF defined for this monitor-date.

### Insert Rules

None

### Update Rules

None.

### Delete Rules

None.

## **5.6.10 RCF End Date**

**Description:** The date on which the required collection frequency (RCF) ended.

**Attributes:** Date  
8-digit date  
Optional

**Coding Instructions:** Place a valid date string in the tenth delimited field. An RCF end date value is valid if it: is in the format of YYYYMMDD, is greater than the RCF begin date, is between July 1, 1987 and one year from the current date, does not fall within any other required collection frequency periods defined for the monitor, and falls within a sample period for the

monitor.

**Business Rules:**

Common Rules

1. RCF End Date must be greater than RCF Begin Date.  
**Error Messages:**
  1. Check constraint (AIRSRAQS.RCF\_GT\_BEGIN\_DATE) violated.
2. RCF End Date must fall within a sample period for the monitor .  
**Error Messages:**
  1. RCF End Date must fall within a sample period for the monitor
3. RCF End Date must not fall within any other RCF Begin Date-RCF End Date range for the same monitor.  
**Error Messages:**
  1. More than one RCF defined for this monitor-date.
4. RCF End Date must not exclude (orphan) any Raw, Precision, Accuracy, or Summary data that has been loaded for the monitor . (I.e. There cannot be any data loaded for the monitor after the RCF End Date.)  
**Error Messages:**
  1. RCF End Date will orphan data for monitor.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

**5.6.11 Collection Frequency - January to December (12 Instances)**

**Description:** Specifies the collection frequency required within an indicated month for a monitor's required collection frequency when that frequency is stratified random, random, or seasonal. Twelve slots are available, one for each month in a year.

**Attributes:** Numeric  
12 digits (nnnnnnnnnnnnnn)  
Optional

**Coding Instructions:** The monthly collection frequency is required when the RCF code is 8, 9, or S (stratified random, random, or seasonal). The delimited field positions for collection frequency are 11-22. Field positions correlate to month number offset by 10, i.e., field 11 is for month 1 (January), field



12 is for month 2 (February), etc. Place a valid collection frequency in the appropriate delimited field. A value is valid if it is a valid collection frequency code for intermittent sampling (values 1, 2, 3, 4, 5, 6, or 7).

**Business Rules:**

Common Rules

1. Collection Frequency may only be valued if RCF Code is '8', '9', or 'S'.

**Error Messages:**

1. The RCF for the Monitor Must = 8, 9, or S to establish a sample schedule.
2. Collection Frequency must be in COLLECTION\_FREQUENCIES table.

**Error Messages:**

1. Integrity constraint (AIRSRAQS.SS\_CF\_FK) violated.
3. Collection Frequency must be at production status.

**Error Messages:**

1. Status for COLL\_FREQ\_CODE is inactive.
4. Collection Frequency must be '1', '3', or '6' if Parameter is '81102'.

**Error Messages:**

1. PM2.5 may only have required collection frequencies of 1, 3, or 6.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

---

## 5.7 Monitor Street Description - Transaction Type MG

See the transaction requirements in the Appendices for a list of transactions required to create sites and monitors. See the data input transaction formats in the Appendices for a list of required fields on each transaction format. For criteria pollutant monitors, transaction types MA through ME are required.

The monitor's relationship to nearby streets may be described by using the MG transaction. If either tangent street number or distance from monitor is valued, the other must also be valued. Similarly, one may not be deleted without also deleting the other.

The fields described below are validated for insert (I) and update (U) transactions.

### 5.7.1 Transaction Type

**Description:** Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

**Attributes:** Alphanumeric  
2-character code  
Mandatory

**Coding Instructions:** Place MG in the first delimited field.

#### **Business Rules:**

##### Common Rules

1. Transaction Type is mandatory

##### **Error Messages:**

1. Transaction Type is Required.
2. Transaction Type must be in TRANSACTION\_TYPES table in database.

##### **Error Messages:**

1. Invalid Transaction Type.

##### Insert Rules

None.

##### Update Rules

None.

##### Delete Rules

None.

### 5.7.2 Action Code

**Description:** Indicates the data manipulation action to be performed by the transaction.

**Attributes:** Alphanumeric  
1-character code  
Mandatory

**Coding Instructions:** Place the values I, U, or D in the second delimited field.  
I - Insert a new row into the appropriate table in the database.  
U - Change one or more column values for an existing row in one or more tables.  
D - Delete a row from a table(s) for the row containing the key data.

#### Business Rules

##### Common Rules

1. Action Code is required.  
**Error Messages:**
  1. Action Code is Required.
2. Action Code must be either 'I', 'U', or 'D'..  
**Error Messages:**
  1. Invalid Action Code.

##### Insert Rules

None.

##### Update Rules

None.

##### Delete Rules

None.

### 5.7.3 State Code

**Description:** A FIPS code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

**Attributes:** Alphanumeric  
2-character code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid FIPS state code in delimited field 3. A code is valid if it exists in the States Table.

**Business Rules**Common Rules:

1. State Code is mandatory.  
**Error Messages:**
  1. State Code is required.
2. A Site with (State Code, County Code, Site ID) must be in the SITES table  
**Error Messages:**
  1. Invalid Site..
  2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

**5.7.4 County Code**

**Description:** A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

**Attributes:** Alphanumeric  
3-digit code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid county code in the fourth delimited field. A code is valid if it exists in combination with state code and city code, in the County Cities Table.

**Business Rules**Common Rules:

1. County Code is required.  
**Error Messages:**
  1. County Code is required.
2. A Site with (State Code, County Code, Site ID) must be in the SITES table  
**Error Messages:**
  1. Invalid Site..
  2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

### 5.7.5 Site ID

**Description:** A numeric identifier (ID) that uniquely identifies each air monitoring site within a county.

**Attributes:**           Alphanumeric  
                              4-digit ID  
                              Mandatory  
                              Key Field

**Coding Instructions:** Place a four-digit numeric code in the fifth delimited field. For update and delete, a site ID value is valid if it exists in combination with State code and county code in the Sites Table.

**Business Rules**Common Rules:

1. Site ID is mandatory.

**Error Messages:**

1. Site ID is required.

2. Site ID must be exactly 4 digits.

**Error Messages:**

1. Invalid Site ID length

3. (State Code, County Code, Site ID) must be in the SITES table.

**Error Messages:**

1. Invalid Site..
2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

### 5.7.6 Parameter

**Description:** The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

**Attributes:** Alphanumeric  
5-digit code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid parameter code in the sixth delimited field. A parameter value is valid if it exists in combination with state code, county code, site ID, and POC in the Monitors Table.

#### Business Rules

##### Common Rules

1. Parameter Code is Mandatory.

**Error Messages:**

1. Parameter Code is required.
2. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database..

**Error Messages:**

1. Monitor ID (State, County, Site, Parameter, POC) not in database.

##### Insert Rules

None.

##### Update Rules

None.

##### Delete Rules

None.

### 5.7.7 POC (Parameter Occurrence Code)

**Description:** An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter.

**Attributes:** Numeric  
2-digit ID  
Mandatory  
Key Field

**Coding Instructions:** Place a valid POC value in the seventh delimited field. A POC value is valid if it exists in combination with state code, county code, site ID, and parameter on the Monitors Table.

**Business Rules**Common Rules

1. POC is Mandatory.

**Error Messages:**

1. POC is required.
2. POC must be a number between 1 and 99..  
**Error Messages:**
  1. Check constraint (AIRSRAQS.AVCON\_632937\_POC\_000) violated.
3. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database..  
**Error Messages:**
  1. Monitor ID (State, County, Site, Parameter, POC) not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

**5.7.8 Tangent Street Number**

**Description:** Designation of a street number that exists for the site. Used to associate information about the relationship between specific monitors at the site and tangent roads at the site.

**Attributes:** Numeric  
2 digits (nn)  
Mandatory  
Key Field

**Coding Instructions:** Place a valid tangent street number in the eighth delimited field. A tangent street number is valid if it exists in combination with state code, county code, and site ID on the Tangent Roads Table.

**Business Rules:**Common Rules

1. Tangent Street Number is required.  
**Error Messages:**
  1. Tangent Street Number is required.

- 
2. Tangent Street number must be in the TANGENT\_ROADS table for the site..

**Error Messages:**

1. Integrity constraint (AIRSRAQS.MTR\_TR\_FK) violated.

**Insert Rules**

1. The Tangent Street Number must not already be in the database for the monitor.

**Error Messages:**

1. Unique constraint (AIRSRAQS.MTR\_UK) violated.

**Update Rules**

None.

**Delete Rules**

None.

### 5.7.9 Distance from Monitor

**Description:** The distance in meters between the sensing of air sampling equipment at a monitoring site and the nearest edge of the roadway.

**Attributes:** Numeric  
10 digits, including 2 decimal places (nnnnnnnn.nn)  
Optional

**Coding Instructions:** Place a valid distance from monitor value in the ninth delimited field. A distance from monitor value is valid if it is greater than 0.

**Business Rules:****Common Rules**

1. Distance from monitor must be greater than 0.

**Error Messages:**

1. Check constraint (AIRSRAQS.MTR\_GT\_0) violated.

**Insert Rules**

None.

**Update Rules**

None.

**Delete Rules**

None.



## 5.8 Monitor Obstruction Information - Transaction Type MH

See the transaction requirements in the Appendices for a list of transactions required to create sites and monitors. See the data input transaction formats in the Appendices for a list of required fields on each transaction format. For criteria pollutant monitors, transaction types MA through ME are required.

The type of obstruction for a monitor with restricted air flow is described by using the MH transaction. See Appendix XX for a description of the transaction formats, including those required to create monitors. For criteria pollutant monitors, transaction types MA through ME are required.

### Transaction Level Rules and Errors

1. A Monitor Obstruction record may not be created if the unrestricted air flow indicator for the monitor (State Code, County Code, Site ID, Parameter, POC) is 'Y'.

#### Error Messages:

1. Probe Obstruction information is not valid for the given Unrestricted Air Flow indicator.

The fields described below are validated for insert (I) and update (U) transactions.

### 5.8.1 Transaction Type

**Description:** Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

**Attributes:** Alphanumeric  
2-character code  
Mandatory

**Coding Instructions:** Place MH in the first delimited field.

#### Business Rules:

##### Common Rules

1. Transaction Type is mandatory

#### Error Messages:

1. Transaction Type is Required.
  2. Transaction Type must be in TRANSACTION\_TYPES table in database.
- #### Error Messages:
1. Invalid Transaction Type.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 5.8.2 Action Code

**Description:** Indicates the data manipulation action to be performed by the transaction.

**Attributes:**           Alphanumeric  
                              1-character code  
                              Mandatory

**Coding Instructions:** Place the values I, U, or D in the second delimited field.  
I - Insert a new row into the appropriate table in the database.  
U - Change one or more column values for an existing row in one or more tables.  
D - Delete a row from a table(s) for the row containing the key data.

#### Business Rules

Common Rules

1. Action Code is required.

**Error Messages:**

1. Action Code is Required.

2. Action Code must be either 'I', 'U', or 'D'..

**Error Messages:**

1. Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 5.8.3 State Code

**Description:** A FIPS code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

**Attributes:**           Alphanumeric  
                          2-character code  
                          Mandatory  
                          Key Field

**Coding Instructions:** Place a valid FIPS state code in delimited field 3. A code is valid if it exists in the States Table.

### Business Rules

#### Common Rules:

1. State Code is mandatory.

**Error Messages:**

1. State Code is required.
  2. A Site with (State Code, County Code, Site ID) must be in the SITES table
- Error Messages:**
1. Invalid Site..
  2. No data found.

#### Insert Rules:

None.

#### Update Rules:

None.

#### Delete Rules:

None.

## 5.8.4 County Code

**Description:** A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

**Attributes:**           Alphanumeric  
                          3-digit code  
                          Mandatory  
                          Key Field

**Coding Instructions:** Place a valid county code in the fourth delimited field. A code is valid if it exists in combination with state code and city code, in the County Cities Table.

**Business Rules**Common Rules:

1. County Code is required.  
**Error Messages:**
  1. County Code is required.
2. A Site with (State Code, County Code, Site ID) must be in the SITES table  
**Error Messages:**
  1. Invalid Site..
  2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

**5.8.5 Site ID**

**Description:** A numeric identifier (ID) that uniquely identifies each air monitoring site within a county.

**Attributes:**           Alphanumeric  
                              4-digit ID  
                              Mandatory  
                              Key Field

**Coding Instructions:** Place a four-digit numeric code in the fifth delimited field. For update and delete, a site ID value is valid if it exists in combination with state code and county code in the Sites Table.

**Business Rules**Common Rules:

1. Site ID is mandatory.  
**Error Messages:**
  1. Site ID is required.
2. Site ID must be exactly 4 digits.  
**Error Messages:**
  1. Invalid Site ID length

- 
3. (State Code, County Code, Site ID) must be in the SITES table.

**Error Messages:**

1. Invalid Site..
2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

### 5.8.6 Parameter

**Description:** The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

**Attributes:** Alphanumeric  
5-digit code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid parameter code in the sixth delimited field. A parameter value is valid if it exists in combination with state code, county code, site ID, and POC in the Monitors Table.

**Business Rules**Common Rules

1. Parameter Code is Mandatory.

**Error Messages:**

1. Parameter Code is required.
2. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database..  
**Error Messages:**
  1. Monitor ID (State, County, Site, Parameter, POC) not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 5.8.7 POC (Parameter Occurrence Code)

**Description:** An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter.

**Attributes:** Numeric  
2-digit ID  
Mandatory  
Key Field

**Coding Instructions:** Place a valid POC value in the seventh delimited field. A POC value is valid if it exists in combination with state code, county code, site ID, and parameter on the Monitors Table.

#### Business Rules

##### Common Rules

1. POC is Mandatory.

**Error Messages:**

1. POC is required.

2. POC must be a number between 1 and 99..

**Error Messages:**

1. Check constraint (AIRSRAQS.AVCON\_632937\_POC\_000) violated.

3. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database..

**Error Messages:**

1. Monitor ID (State, County, Site, Parameter, POC) not in database.

##### Insert Rules

None.

##### Update Rules

None.

##### Delete Rules

None.

### 5.8.8 Type Obstruction

**Description:** The type of obstruction responsible for the restricted air flow of a monitor.

**Attributes:** Alphanumeric  
Up to 20 characters  
Mandatory  
Key Field

**Coding Instructions:** Place a valid type obstruction term in the eighth delimited field. A type obstruction value is valid if it exists in the Probe Obstruction Types Table.

**Business Rules:**Common Rules

1. Type of Obstruction is required.  
**Error Messages:**
  1. Type of Obstruction is required.
2. Type of Obstruction must be in PROBE\_OBSTRUCTION\_TYPES table..  
**Error Messages:**
  1. Integrity constraint (AIRSRAQS.POB\_POT\_FK) violated.
3. Type of Obstruction must be at production status.  
**Error Messages:**
  1. Status for PROBE\_OBSTR\_TYPE is inactive.

Insert Rules

1. The combination of Type of Obstruction and Direction From Monitor must not already exist in database for monitor.  
**Error Messages:**
  1. Unique constraint (AIRSRAQS.POB\_UK) violated

Update Rules

None.

Delete Rules

None.

**5.8.9 Direction from Monitor**

**Description:** The direction from the monitor to the obstruction.

**Attributes:** Alphanumeric  
3-character code  
Mandatory

**Coding Instructions:** Place a valid direction from monitor in the ninth delimited field. A direction from monitor value is valid if it exists in the Compass Sectors Table.

**Business Rules:**Common Rules

1. Direction From Monitor is required.  
**Error Messages:**
  1. Direction From Monitor is required.

2. Direction From Monitor must be in COMPASS\_SECTORS table..  
**Error Messages:**
  1. Integrity constraint (AIRSRAQS.POB\_CS\_FK) violated.
3. Direction From Monitor must be at production status (in COMPASS\_SECTORS)..  
**Error Messages:**
  1. Integrity constraint (AIRSRAQS.POB\_CS\_FK) violated

Insert Rules

1. The combination of Type of Obstruction and Direction From Monitor must not already exist in database for monitor.  
**Error Messages:**
  1. Unique constraint (AIRSRAQS.POB\_UK) violated

Update Rules

None.

Delete Rules

None.

### 5.8.10 Distance to Monitor

**Description:** The distance, in meters, between the probe and obstruction.

**Attributes:** Numeric  
10 digits, including 2 decimal places (nnnnnnnn.nn)  
Mandatory

**Coding Instructions:** Place a valid distance to monitor value in the tenth delimited field. A distance to monitor value is valid if it is greater than 0.

**Business Rules:**

Common Rules

1. Distance To Monitor is required.  
**Error Messages:**
  1. Distance To Monitor is required.
2. Distance To Monitor must be greater than 0.  
**Error Messages:**
  1. Distance To Monitor must be greater than 0.

Insert Rules

None.

Update Rules



None.

#### Delete Rules

None.

### **5.8.11 Height of Obstruction**

**Description:** The height, in meters, of the top of the obstruction above the probe.

**Attributes:** Numeric  
10 digits, including 2 decimal places (nnnnnnnn.nn)  
Mandatory

**Coding Instructions:** Place a valid height of obstruction value in the eleventh delimited field.  
A height of obstruction value is valid if it is greater than 0.

#### **Business Rules:**

##### Common Rules

1. Height of Obstruction must be greater than 0..

##### **Error Messages:**

1. Height of Obstruction must be greater than 0.

##### Insert Rules

1. Height of Obstruction is required.

##### **Error Messages:**

1. Height of Obstruction is required.

##### Update Rules

None.

##### Delete Rules

None.

---

## 5.9 Monitor Regulatory Compliance - Transaction Type MI

See the transaction requirements in the Appendices for a list of transactions required to create sites and monitors. See the data input transaction formats in the Appendices for a list of required fields on each transaction format. For criteria pollutant monitors, transaction types MA through ME are required.

The fields described below are validated for insert (I) and update (U) transactions.

### 5.9.1 Transaction Type

**Description:** Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

**Attributes:**           Alphanumeric  
                          2-character code  
                          Mandatory

**Coding Instructions:** Place MI in the first delimited field.

#### Business Rules:

##### Common Rules

1. Transaction Type is mandatory

##### **Error Messages:**

1. Transaction Type is Required.
2. Transaction Type must be in TRANSACTION\_TYPES table in database.

##### **Error Messages:**

1. Invalid Transaction Type.

##### Insert Rules

None.

##### Update Rules

None.

##### Delete Rules

None.

### 5.9.2 Action Code

**Description:** Indicates the data manipulation action to be performed by the transaction.

**Attributes:**           Alphanumeric  
                          1-character code  
                          Mandatory

**Coding Instructions:** Place the values I, U, or D in the second delimited field.  
I - Insert a new row into the appropriate table in the database.  
U - Change one or more column values for an existing row in one or more tables.  
D - Delete a row from a table(s) for the row containing the key data.

### **Business Rules**

#### Common Rules

1.     Action Code is required.  
      **Error Messages:**
  1.     Action Code is Required.
2.     Action Code must be either 'I', 'U', or 'D'..  
      **Error Messages:**
  1.     Invalid Action Code.

#### Insert Rules

None.

#### Update Rules

None.

#### Delete Rules

None.

### **5.9.3 State Code**

**Description:**       A FIPS code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

**Attributes:**       Alphanumeric  
                          2-character code  
                          Mandatory  
                          Key Field

**Coding Instructions:** Place a valid FIPS state code in delimited field 3. A code is valid if it exists in the States Table.

### **Business Rules**

#### Common Rules:

1.     State Code is mandatory.  
      **Error Messages:**
  1.     State Code is required.

2. A Site with (State Code, County Code, Site ID) must be in the SITES table

**Error Messages:**

1. Invalid Site..
2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

### 5.9.4 County Code

**Description:** A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

**Attributes:** Alphanumeric  
3-digit code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid county code in the fourth delimited field. A code is valid if it exists in combination with state code and city code, in the County Cities Table.

#### Business Rules

Common Rules:

1. County Code is required.

**Error Messages:**

1. County Code is required.
  2. A Site with (State Code, County Code, Site ID) must be in the SITES table
- Error Messages:**
1. Invalid Site..
  2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

## 5.9.5 Site ID

**Description:** A numeric identifier (ID) that uniquely identifies each air monitoring site within a county.

**Attributes:** Alphanumeric  
4-digit ID  
Mandatory  
Key Field

**Coding Instructions:** Place a four-digit numeric code in the fifth delimited field. For update and delete, a site ID value is valid if it exists in combination with state code and county code in the Sites Table.

### Business Rules

Common Rules:

1. Site ID is mandatory.

**Error Messages:**

1. Site ID is required.

2. Site ID must be exactly 4 digits.

**Error Messages:**

1. Invalid Site ID length

3. (State Code, County Code, Site ID) must be in the SITES table.

**Error Messages:**

1. Invalid Site..
2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

## 5.9.6 Parameter

**Description:** The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

**Attributes:**           Alphanumeric  
                          5-digit code  
                          Mandatory  
                          Key Field

**Coding Instructions:** Place a valid parameter code in the sixth delimited field. A parameter value is valid if it exists in combination with state code, county code, site ID, and POC in the Monitors Table.

## **Business Rules**

### Common Rules

1. Parameter Code is Mandatory.

**Error Messages:**

1. Parameter Code is required.
2. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database..

**Error Messages:**

1. Monitor ID (State, County, Site, Parameter, POC) not in database.

### Insert Rules

None.

### Update Rules

None.

### Delete Rules

None.

## **5.9.7 POC (Parameter Occurrence Code)**

**Description:** An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter.

**Attributes:**           Numeric  
                          2-digit ID  
                          Mandatory  
                          Key Field

**Coding Instructions:** Place a valid POC value in the seventh delimited field. A POC value is valid if it exists in combination with state code, county code, site ID, and parameter on the Monitors Table.

**Business Rules**Common Rules

1. POC is Mandatory.  
**Error Messages:**
  1. POC is required.
2. POC must be a number between 1 and 99..  
**Error Messages:**
  1. Check constraint (AIRSRAQS.AVCON\_632937\_POC\_000) violated.
3. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database..  
**Error Messages:**
  1. Monitor ID (State, County, Site, Parameter, POC) not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

**5.9.8 Monitor Regulation Code**

**Description:** Identification of an EPA regulation for which compliance documentation is required.

**Attributes:**           Alphanumeric  
                              2-character code  
                              Mandatory  
                              Key Field

**Coding Instructions:** Place a valid monitor regulation code in the eighth delimited field. A monitor regulation code value is valid if it exists in combination with parameter on the Parameter Regulations Table.

**Business Rules:**Common Rules

1. Monitor Regulation Code is required.  
**Error Messages:**
  1. Monitor Regulation Code is required.
2. Monitor Regulation Code must be in REGULATIONS table.  
**Error Messages:**
  1. Integrity constraint (AIRSRAQS.RC\_RE\_FK) violated.

3. Monitor Regulation Code must be at production status.

**Error Messages:**

1. Status for REGULATION\_CODE is inactive.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 5.9.9 Compliance Indicator

**Description:** The compliance status of a monitor with respect to an EPA regulation.

**Attributes:**           Alphanumeric  
                              1-character code  
                              Mandatory  
                              Key Field

**Coding Instructions:** Place a compliance indicator in the ninth delimited field. A compliance indicator value is valid for the following cases: monitor regulation code is RM or ST and compliance indicator is Y or N; monitor regulation code is SC and compliance indicator is Y, N, or W; monitor regulation code is QC and compliance indicator is Y, N, or C. Indicators: Y (in compliance with the regulation), N (not in compliance with the regulation), W (compliance has been waived), or C (in conditional compliance with the regulation).

**Business Rules:**

Common Rules

1. Compliance Indicator may be: 'Y' or 'N' if Monitor Regulation Code is 'ST', 'RM', or 'FC'.

**Error Messages:**

1. Check constraint (AIRSRAQS.RC\_COMP\_IND) violated.

2. Compliance Indicator may be: 'Y', 'N', or 'W' if Monitor Regulation Code is 'SC'.

**Error Messages:**

1. Check constraint (AIRSRAQS.RC\_COMP\_IND) violated.

3. Compliance Indicator may be 'Y', 'N', or 'C' if Monitor Regulation Code is 'QC'.

**Error Messages:**

1. Check constraint (AIRSRAQS.RC\_COMP\_IND) violated.



Insert Rules

None.

Update Rules

None.

Delete Rules

None.

**5.9.10 Compliance Date**

**Description:** The date on which the current status of the monitor's compliance with the regulation was achieved.

**Attributes:** Date  
8-digit date  
Mandatory  
Key Field

**Coding Instructions:** Place a valid compliance date in the tenth delimited field. A compliance date value is valid if it is in the form of YYYYMMDD and compliance indicator is Y, W, or C.

**Business Rules:**Common Rules

1. If Monitor Regulation Code is 'SC' and Compliance Indicator is 'Y' or 'W' then Compliance Date must be between 1/1/1957 and one year from the current date.  
**Error Messages:**
  1. Compliance Date must be between 1/1/1957 and one year from the current date.
2. If Monitor Regulation Code is 'SC' and Compliance Indicator is 'N' then Compliance Date is not allowed.  
**Error Messages:**
  1. Compliance Date is not allowed.
3. If Monitor Regulation Code is 'QC' and Compliance Indicator is 'Y' or 'C' then Compliance Date must be between 1/1/1957 and the current date.  
**Error Messages:**
  1. Compliance Date must be between 1/1/1957 and the current date.
4. If Monitor Regulation Code is 'QC' and Compliance Indicator is 'N' then Compliance Date is not allowed.  
**Error Messages:**
  1. Compliance Date is not allowed.

- 
5. If Monitor Regulation Code is 'FC', then Compliance Date must be between 1/1/1957 and the current date.  
**Error Messages:**  
1. Compliance Date must be between 1/1/1957 and the current date.
6. If Monitor Regulation Code is 'RM', and Compliance Indicator is 'Y' then Compliance Date must be between 1/1/1970 and the current date.  
**Error Messages:**  
1. Compliance Date must be between 1/1/1970 and the current date.
7. If Monitor Regulation Code is 'RM' and Compliance Indicator is 'N' then Compliance Date is not allowed.  
**Error Messages:**  
1. Compliance Date is not allowed.
8. If Monitor Regulation Code is 'ST' and Compliance Indicator is 'Y' then Compliance Date must be between 7/1/1987 and one year from the current date.  
**Error Messages:**  
1. Compliance Date must be between 7/1/1987 and one year from the current date.
9. If Monitor Regulation Code is 'ST' and Compliance Indicator is 'N' then Compliance Date is not allowed.  
**Error Messages:**  
1. Compliance Date is not allowed.
10. Compliance Date must fall within a sampling period of the monitor.  
**Error Messages:**  
1. Compliance Date must fall within a sampling period of the monitor.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

## 5.10 Monitor Collocation Period - Transaction Type MJ

See the transaction requirements in the Appendices for a list of transactions required to create sites and monitors. See the data input transaction formats in the Appendices for a list of required fields on each transaction format. For criteria pollutant monitors, transaction types MA through ME are required.

The fields described below are validated for insert (I) and update (U) transactions.

### Transaction Level Rules and Errors

1. The Monitor Collation Period cannot be deleted when Raw, Precision, Accuracy, or Summary data has been loaded in the date range for the Monitor Collocation Period,

#### Error Messages:

1. Integrity constraint () violated.

### 5.10.1 Transaction Type

**Description:** Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

**Attributes:** Alphanumeric  
2-character code  
Mandatory

**Coding Instructions:** Place MJ in the first delimited field.

#### Business Rules:

##### Common Rules

1. Transaction Type is mandatory

#### Error Messages:

1. Transaction Type is Required.
2. Transaction Type must be in TRANSACTION\_TYPES table in database.

#### Error Messages:

1. Invalid Transaction Type.

##### Insert Rules

None.

##### Update Rules

None.

##### Delete Rules

None.

### 5.10.2 Action Code

**Description:** Indicates the data manipulation action to be performed by the transaction.

**Attributes:** Alphanumeric  
1-character code  
Mandatory

**Coding Instructions:** Place the values I, U, or D in the second delimited field.  
I - Insert a new row into the appropriate table in the database.  
U - Change one or more column values for an existing row in one or more tables.  
D - Delete a row from a table(s) for the row containing the key data.

#### Business Rules

##### Common Rules

1. Action Code is required.  
**Error Messages:**
  1. Action Code is Required.
2. Action Code must be either 'I', 'U', or 'D'..  
**Error Messages:**
  1. Invalid Action Code.

##### Insert Rules

None.

##### Update Rules

None.

##### Delete Rules

None.

### 5.10.3 State Code

**Description:** A FIPS code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

**Attributes:** Alphanumeric  
2-character code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid FIPS state code in delimited field 3. A code is valid if it exists in the States Table.

**Business Rules**Common Rules:

1. State Code is mandatory.  
**Error Messages:**
  1. State Code is required.
2. A Site with (State Code, County Code, Site ID) must be in the SITES table  
**Error Messages:**
  1. Invalid Site..
  2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

**5.10.4 County Code**

**Description:** A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

**Attributes:** Alphanumeric  
3-digit code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid county code in the fourth delimited field. A code is valid if it exists in combination with state code and city code, in the County Cities Table.

**Business Rules**Common Rules:

1. County Code is required.  
**Error Messages:**
  1. County Code is required.
2. A Site with (State Code, County Code, Site ID) must be in the SITES table  
**Error Messages:**
  1. Invalid Site..
  2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

**5.10.5 Site ID**

**Description:** A numeric identifier (ID) that uniquely identifies each air monitoring site within a county.

**Attributes:**           Alphanumeric  
                          4-digit ID  
                          Mandatory  
                          Key Field

**Coding Instructions:** Place a four-digit numeric code in the fifth delimited field. For update and delete, a site ID value is valid if it exists in combination with state code and county code in the Sites Table.

**Business Rules**Common Rules:

1. Site ID is mandatory.

**Error Messages:**

1. Site ID is required.

2. Site ID must be exactly 4 digits.

**Error Messages:**

1. Invalid Site ID length

3. (State Code, County Code, Site ID) must be in the SITES table.

**Error Messages:**

1. Invalid Site..
2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

### 5.10.6 Parameter

**Description:** The code assigned to the parameter measured by the monitor.  
Parameters may be pollutants or non-pollutants.

**Attributes:** Alphanumeric  
5-digit code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid parameter code in the sixth delimited field. A parameter value is valid if it exists in combination with state code, county code, site ID, and POC in the Monitors Table.

#### Business Rules

##### Common Rules

1. Parameter Code is Mandatory.

**Error Messages:**

1. Parameter Code is required.
2. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database..

**Error Messages:**

1. Monitor ID (State, County, Site, Parameter, POC) not in database.

##### Insert Rules

None.

##### Update Rules

None.

##### Delete Rules

None.

### 5.10.7 POC (Parameter Occurrence Code)

**Description:** An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter.

**Attributes:** Numeric  
2-digit ID  
Mandatory  
Key Field

**Coding Instructions:** Place a valid POC value in the seventh delimited field. A POC value is valid if it exists in combination with state code, county code, site ID, and parameter on the Monitors Table.

**Business Rules****Common Rules**

1. POC is Mandatory.

**Error Messages:**

1. POC is required.
2. POC must be a number between 1 and 99..  
**Error Messages:**
  1. Check constraint (AIRSRAQS.AVCON\_632937\_POC\_000) violated.
3. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database..  
**Error Messages:**
  1. Monitor ID (State, County, Site, Parameter, POC) not in database.

**Insert Rules**

None.

**Update Rules**

None.

**Delete Rules**

None.

**5.10.8 Collocation Begin Date**

**Description:** The beginning date of the time period during which a collocated monitor pair recorded precision and accuracy data. Used to determine data completeness.

**Attributes:** Date  
8-digit date  
Mandatory  
Key Field

**Coding Instructions:** Place a valid collocation begin date in the eighth delimited field. A collocation begin date value is valid if:

- 1) it is in the format of YYYYMMDD, primary monitor indicator is Y, and the collocation begin date does not fall within any other collocation period defined for the monitor, or
- 2) primary monitor indicator is N, and collocation begin date falls within a primary monitor collocation period defined for a monitor of the same parameter at the same site.



**Business Rules:****Common Rules**

1. Collocation Begin Date is required.  
**Error Messages:**
  1. Collocation Begin Date is required.
2. Collocation Begin Date must not fall within any other Collocation Begin Date-Collocation End Date range for the same monitor.  
**Error Messages:**
  1. Date cannot be within an existing date range.
3. Collocation Begin Date must fall within a sampling period of the monitor.  
**Error Messages:**
  1. Collocation Begin Date must fall within a valid sample period.

**Insert Rules**

None.

**Update Rules**

None.

**Delete Rules**

None.

**5.10.9 Collocation End Date**

**Description:** The ending date of the time period during which a collocated monitor pair recorded precision and accuracy data. Used to determine data completeness.

**Attributes:** Date  
8-digit date  
Optional

**Coding Instructions:** Place a valid collocation end date in the ninth delimited field. A collocation end date value is valid if:

- 1) it is in the format of YYYYMMDD and either primary monitor indicator is Y and the collocation end date does not fall within any other collocation period defined for the monitor, or
- 2) primary monitor indicator is N, and the collocation end date falls within a primary monitor collocation period defined for a monitor of the same parameter at the same site.

**Business Rules:**Common Rules

1. Collocation End Date must be greater than Collocation Begin Date.  
**Error Messages:**
  1. End Date must be greater than Begin Date.
2. Collocation End Date must not fall within any other Collocation Begin Date-Collocation End Date range for the same monitor.  
**Error Messages:**
  1. Date cannot be within an existing date range..
3. Collocation End Date must fall within a sampling period of the monitor.  
**Error Messages:**
  1. Collocation End Date must fall within a valid sample period.
4. Collocation End Date must not exclude (orphan) any Raw, Precision, Accuracy, or Summary data that has been loaded for the monitor . (I.e. There cannot be any data loaded for the monitor after the Collocation End Date.)  
**Error Messages:**
  1. Collocation End Date will orphan data for monitor.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

**5.10.10 Distance from Primary Monitor**

**Description:** The distance, in meters, between a duplicate sampler and the primary sampler in a collocated pair.

**Attributes:** Numeric  
10 digits, including 2 decimal places (nnnnnnnn.nn)  
Optional

**Coding Instructions:** Place a valid distance from primary monitor in the tenth delimited field.

**Business Rules:**Common Rules

1. Distance from Primary Monitor must be between 2 and 4..  
**Error Messages:**
  1. Distance from Primary Monitor must be between 2 and 4.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 5.10.11 Primary Monitor Indicator

**Description:** Indicates whether the monitor is the primary or duplicate monitor in a collocated monitor pair.

**Attributes:** 1-character code: Y or N  
Mandatory

**Coding Instructions:** Place a valid primary monitor indicator in the eleventh delimited field. A primary monitor indicator value is valid if it is Y (for primary) or N (for not primary).

**Business Rules:**Common Rules

1. Primary Monitor Indicator is required..

**Error Messages:**

1. Primary Monitor Indicator is required..
2. Primary Monitor Indicator must be 'Y' or 'N'..  
**Error Messages:**
  1. Primary Monitor Indicator must be 'Y' or 'N'.
3. If Primary Monitor Indicator is 'N', then there must be another monitor of the same parameter at the same site that is defined as the primary monitor..  
**Error Messages:**
  1. No Primary Monitor Defined.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

## 5.11 Monitor Protocol - Transaction Type MK

See the transaction requirements in the Appendices for a list of transactions required to create sites and monitors. See the data input transaction formats in the Appendices for a list of required fields on each transaction format. For criteria pollutant monitors, transaction types MA through ME are required.

This transaction is needed only to specify an alternate method detectable limit when the Federal default is not used.

The fields described below are validated for insert (I) and update (U) transactions.

### Transaction Level Rules and Errors

1. The monitor protocol cannot be deleted when Raw, Precision, Accuracy or Summary data has been loaded that uses the Monitor Protocol.

#### Error Messages:

1. Monitor protocol can not be deleted when raw data present..

### 5.11.1 Transaction Type

**Description:** Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

**Attributes:**           Alphanumeric  
                              2-character code  
                              Mandatory

**Coding Instructions:** Place MK in the first delimited field.

#### Business Rules:

##### Common Rules

1. Transaction Type is mandatory

#### Error Messages:

1. Transaction Type is Required.
  2. Transaction Type must be in TRANSACTION\_TYPES table in database.
- #### Error Messages:
1. Invalid Transaction Type.

##### Insert Rules

None.

##### Update Rules

None.

Delete Rules

None.

### 5.11.2 Action Code

**Description:** Indicates the data manipulation action to be performed by the transaction.

**Attributes:** Alphanumeric  
1-character code  
Mandatory

**Coding Instructions:** Place the values I, U, or D in the second delimited field.  
I - Insert a new row into the appropriate table in the database.  
U - Change one or more column values for an existing row in one or more tables.  
D - Delete a row from a table(s) for the row containing the key data.

#### Business Rules

Common Rules

1. Action Code is required.

**Error Messages:**

1. Action Code is Required.

2. Action Code must be either 'I', 'U', or 'D'..

**Error Messages:**

1. Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 5.11.3 State Code

**Description:** A FIPS code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

**Attributes:** Alphanumeric  
2-character code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid FIPS state code in delimited field 3. A code is valid if it exists in the States Table.

**Business Rules**Common Rules:

1. State Code is mandatory.

**Error Messages:**

1. State Code is required.
2. A Site with (State Code, County Code, Site ID) must be in the SITES table

**Error Messages:**

1. Invalid Site..
2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

**5.11.4 County Code**

**Description:** A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

**Attributes:** Alphanumeric  
3-digit code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid county code in the fourth delimited field. A code is valid if it exists in combination with state code and city code, in the County Cities Table.

**Business Rules**Common Rules:

1. County Code is required.

**Error Messages:**

1. County Code is required.

- 
2. A Site with (State Code, County Code, Site ID) must be in the SITES table

**Error Messages:**

1. Invalid Site..
2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

### 5.11.5 Site ID

**Description:** A numeric identifier (ID) that uniquely identifies each air monitoring site within a county.

**Attributes:**           Alphanumeric  
                              4-digit ID  
                              Mandatory  
                              Key Field

**Coding Instructions:** Place a four-digit numeric code in the fifth delimited field. For update and delete, a site ID value is valid if it exists in combination with state code and county code in the Sites Table.

**Business Rules**Common Rules:

1. Site ID is mandatory.

**Error Messages:**

1. Site ID is required.

2. Site ID must be exactly 4 digits.

**Error Messages:**

1. Invalid Site ID length

3. (State Code, County Code, Site ID) must be in the SITES table.

**Error Messages:**

1. Invalid Site..
2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

### 5.11.6 Parameter

**Description:** The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

**Attributes:** Alphanumeric  
5-digit code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid parameter code in the sixth delimited field. A parameter value is valid if it exists in combination with state code, county code, site ID, and POC in the Monitors Table.

#### Business Rules

Common Rules

1. Parameter Code is Mandatory.

**Error Messages:**

1. Parameter Code is required.
2. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database..

**Error Messages:**

1. Monitor ID (State, County, Site, Parameter, POC) not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 5.11.7 POC (Parameter Occurrence Code)

**Description:** An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter.



**Attributes:**           Numeric  
                          2-digit ID  
                          Mandatory  
                          Key Field

**Coding Instructions:** Place a valid POC value in the seventh delimited field. A POC value is valid if it exists in combination with state code, county code, site ID, and parameter on the Monitors Table.

## **Business Rules**

### Common Rules

1. POC is Mandatory.

**Error Messages:**

1. POC is required.
2. POC must be a number between 1 and 99..  
**Error Messages:**
  1. Check constraint (AIRSRAQS.AVCON\_632937\_POC\_000) violated.
3. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database..  
**Error Messages:**
  1. Monitor ID (State, County, Site, Parameter, POC) not in database.

### Insert Rules

None.

### Update Rules

None.

### Delete Rules

None.

## **5.11.8 Monitor Protocol ID**

**Description:**           The sequential Monitor Protocol Identification (MP ID) number used to distinguish combinations of sample duration, unit, method, collection frequency, composite type, and alternate method detectable limit (Alt-MDL) for a monitor.

**Attributes:**           Numeric  
                          4 digits (nnnn)  
                          Mandatory  
                          Key Field

**Coding Instructions:** Place a valid Monitor Protocol ID in the eighth delimited field. A Monitor Protocol ID value is valid if it is between 1 and 99 and has not been assigned to another protocol combination for the monitor.

**Business Rules:**Common Rules

1. Monitor Protocol ID must be greater than 0

**Error Messages:**

1. MP ID must be greater than 0

Insert Rules

1. Monitor Protocol ID cannot already be in database for monitor..

**Error Messages:**

1. Monitor Protocol ID cannot already be in database for monitor.

Update Rules

None.

Delete Rules

None.

**5.11.9 Sample Duration**

**Description:** The length of time used to acquire raw samples that are analyzed by monitors and documented in the Raw Data, Precision, or Accuracy Tables. (Formerly: interval)

**Attributes:** Alphanumeric  
1-character code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid sample duration code in the ninth delimited field. A sample duration value is valid if it exists in the Sample Durations Table and if it exists in combination with unit, parameter, method, collection frequency, and composite type in the Protocols Table.

**Business Rules:**Common Rules

1. The combination of (Sample Duration, Unit, Parameter, Method, Sampling Frequency, Composite Type) must be in PROTOCOLS table.

**Error Messages:**

1. Invalid Protocol.

Insert Rules

1. The combination of (State Code, County Code, Site ID, Parameter, POC, Sample Duration, Unit, Method, Sampling Frequency, Composite Type, Alternate Minimum Detectable Limit) cannot already be in database for the monitor.

**Error Messages:**

1. Unique constraint (AIRSRAQS.MP\_UK) violated.

Update Rules

1. Sample Duration is not an updateable field..

**Error Messages:**

1. Sample Duration is not an updateable field.

Delete Rules

None.

**5.11.10 Unit**

**Description:** The dimensional system in which a pollutant concentration or parameter reading is expressed.

**Attributes:** Alphanumeric  
3-digit code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid unit code in the tenth delimited field. A unit value is valid if it exists in the Units Table and if it exists in combination with sample duration, parameter, method, collection frequency, and composite type in the Protocols Table.

**Business Rules:**Common Rules

1. The combination of (Sample Duration, Unit, Parameter, Method, Sampling Frequency, Composite Type) must be in PROTOCOLS table.

**Error Messages:**

1. Invalid Protocol

Insert Rules

1. The combination of (State Code, County Code, Site ID, Parameter, POC, Sample Duration, Unit, Method, Sampling Frequency, Composite Type, Alternate Minimum Detectable Limit) cannot already be in database for the monitor.

**Error Messages:**

1. Unique constraint (AIRSRAQS.MP\_UK) violated.

Update Rules

1. Unit is not an updateable field..

**Error Messages:**

1. Unit is not an updatable field.

Delete Rules

None.

**5.11.11 Method**

**Description:** Specification of a particular method for collecting and analyzing samples of the monitor's parameter.

**Attributes:** Alphanumeric  
3-digit code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid method code in the eleventh delimited field. A method value is valid if it exists in combination with parameter in the Sampling Methodologies Table, and if it exists in combination with sample duration, unit, collection frequency, and composite type in the Protocols Table.

**Business Rules:**Common Rules

1. The combination of (Sample Duration, Unit, Parameter, Method, Sampling Frequency, Composite Type) must be in PROTOCOLS table.

**Error Messages:**

1. Invalid Protocol

Insert Rules

1. The combination of (State Code, County Code, Site ID, Parameter, POC, Sample Duration, Unit, Method, Sampling Frequency, Composite Type, Alternate Minimum Detectable Limit) cannot already be in database for the monitor.

**Error Messages:**

1. Unique constraint (AIRSRAQS.MP\_UK) violated.

Update Rules

1. Method is not an updateable field..

**Error Messages:**

1. Method is not an updateable field.

Delete Rules

None.

### 5.11.12 Collection Frequency

**Description:** The frequency according to which sample observations are to be made, specified as the amount of time that elapses between observations. Indicates how often 24-hour samples are taken, e.g., daily, every third day, stratified random, etc.

**Attributes:** Alphanumeric  
1- or 2-digit code  
Optional  
Key Field

**Coding Instructions:** Place a valid collection frequency code in the twelfth delimited field. A collection frequency value is valid if it exists in the Collection Frequencies Table and if it exists in combination with parameter, method, sample duration, unit, and composite type in the Protocols Table.

#### Business Rules:

##### Common Rules

1. The combination of (Sample Duration, Unit, Parameter, Method, Sampling Frequency, Composite Type) must be in PROTOCOLS table.

##### **Error Messages:**

1. Invalid Protocol.

##### Insert Rules

1. The combination of (State Code, County Code, Site ID, Parameter, POC, Sample Duration, Unit, Method, Sampling Frequency, Composite Type, Alternate Minimum Detectable Limit) cannot already be in database for the monitor.

##### **Error Messages:**

1. Unique constraint (AIRSRAQS.MP\_UK) violated.

##### Update Rules

1. Sampling Frequency is not an updateable field..

##### **Error Messages:**

1. Sampling Frequency is not an updateable field.

##### Delete Rules

None.

### 5.11.13 Composite Type

**Description:** The time period over which samples are composited, or the frequency of submitting composite samples.

**Attributes:**           Alphanumeric  
                          10 characters  
                          Optional  
                          Key Field

**Coding Instructions:** Place a valid composite type term in the thirteenth delimited field. A composite type value is valid if it exists in the Composite Types Table, it exists in combination with parameter, method, sample duration, unit, and collection frequency in the Protocols Table, and sample duration is C.

### **Business Rules:**

#### Common Rules

1. The combination of (Sample Duration, Unit, Parameter, Method, Sampling Frequency, Composite Type) must be in PROTOCOLS table.

**Error Messages:**

1. Invalid Protocol.

#### Insert Rules

1. The combination of (State Code, County Code, Site ID, Parameter, POC, Sample Duration, Unit, Method, Sampling Frequency, Composite Type, Alternate Minimum Detectable Limit) cannot already be in database for the monitor.

**Error Messages:**

1. Unique constraint (AIRSRAQS.MP\_UK) violated.

#### Update Rules

1. Sampling Frequency is not an updateable field..

**Error Messages:**

1. Sampling Frequency is not an updateable field.

#### Delete Rules

None.

### **5.11.14 Alternate Method Detectable Limit (Alt-MDL)**

**Description:** The alternate method detectable limit defined for the monitor by the reporting agency, which supercedes the EPA-defined method detectable limit for the designated methodology.

**Attributes:**           Numeric  
                          10 digits, including 5 decimal places (nnnnn.nnnnn)  
                          Optional

**Coding Instructions:** Place an Alternate MDL value in the fourteenth delimited field. There are no edit checks to verify the validity of an alternate method detectable limit value.

**Business Rules:**

Common Rules

None.

Insert Rules

1. The combination of (State Code, County Code, Site ID, Parameter, POC, Sample Duration, Unit, Method, Sampling Frequency, Composite Type, Alternate Minimum Detectable Limit) cannot already be in database for the monitor.

**Error Messages:**

1. Unique constraint (AIRSRAQS.MP\_UK) violated.

Update Rules

None.

Delete Rules

None.

## 5.12 Monitor Comments (Online Input Only)

**Description:** Monitor comments is a free-format field that may be used in any way. It is normally used to describe special features of the monitor.

**Attributes:** 62-character field  
Optional



---

## 6.0 Raw Data Transactions (RC, RD)

Transaction Types RC (Composite Raw Data) and RD (Hourly, Daily, Sub-Hourly Raw Data) perform data manipulation on the Raw Data Table.

The transactions in this group are used to insert, update, and delete the individual observations of parameter values in the AQS database. Most of the parameter values are the concentrations of air pollutants measured with various methods and at various time intervals. Some non-pollutant observations are also reported, such as wind speed and other meteorological values. Together, these observations of parameter values are collectively called raw data because they are the actual values reported by the monitoring sites. There are two types of Raw Data, "Hourly, Daily, Sub-Hourly" and Composite.

Hourly, Daily, Sub-Hourly Raw Data are the sample values that have been collected by monitoring stations that can be defined for a given date and time of day. Types of Hourly, Daily, Sub-Hourly Raw Data include: hourly, daily, and sub-hourly type of data.

Composite data are concentration values derived from two or more air samples obtained at different times and combined and analyzed as one sample.

In contrast to this is the summary data, which is usually calculated from the raw data by the AQS software, and is stored in the summaries tables.

The qualifier field is used only with real observations, when an observed parameter value is present. A non-blank qualifier indicates the observed value is exceptional in some way, usually higher than normal by a substantial amount. The value of the qualifier indicates the cause of the exceptional observation (a forest fire, for example). If no specific cause can be attributed for the exceptional observation, V is coded for the qualifier (to indicate that the value is valid). A non-blank qualifier exempts the associated observation from certain quality assurance tests which it would not otherwise pass. Without the exemption provided by the qualifier, neither the exceptional data nor any normal data for the same day or month would pass the quality assurance tests.

Most values do not have qualifiers, since qualifiers are only associated with rare (exceptional) events or circumstances. Furthermore, the use of qualifiers is important only for criteria pollutants. Every episode of qualifier usage (except code V) must be approved by state and EPA officials and must conform with the procedures and requirements set forth in Guideline on the Identification and Use of Air Quality Data Affected by Exceptional Events, publication number EPA-450/4-86-007, July, 1986.

Action codes are interpreted the same way for raw data transactions. Insert actions are used to enter raw data values where none previously existed. The monitor reporting the raw data values must already exist in the database. Delete actions are used to remove one or more existing raw data values from the AQS database. Update actions are used to change existing raw data values.

Transaction type RC contains composite raw data with the following fields:

Transaction Type	Year	Qualifier-4
Action Code	Period	Qualifier-5
State Code	Number of Samples	Qualifier-6
County Code	Composite Type	Qualifier-7
Site ID	Sample Value	Qualifier-8
Parameter	MP ID	Qualifier-9
POC	Qualifier-1	Qualifier-10
Unit	Qualifier-2	Alt MDL
Method	Qualifier-3	Uncertainty

Transaction type RD contains Hourly, Daily, Sub-Hourly data with the following fields:

Transaction Type	Date	Qualifier-5
Action Code	Start Time	Qualifier-6
State Code	Sample Value	Qualifier-7
County Code	Null Data Code	Qualifier-8
Site ID	Collection Frequency	Qualifier-9
Parameter	MP ID	Qualifier-10
POC	Qualifier-1	Alt MDL
Sample Duration	Qualifier-2	Uncertainty
Unit	Qualifier-3	
Method	Qualifier-4	

Detailed coding instructions for these raw data transactions are given in the following sections.

---

## 6.1 Composite Raw Data - Transaction Type RC

See the data input transaction formats in the Appendices for a list of required fields on each transaction format. Transaction type RC is used for composite observations. Type RC transactions insert, update, and delete raw data values in the Raw Data Table of the AQS database.

An insert transaction is used to insert a new observation into the database where none already exists. An update transaction is used to change or delete an existing observation in the database. A delete transaction is used to delete an observation and its associated fields from the database.

### 6.1.1 Transaction Type

**Description:** Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

**Attributes:**           Alphanumeric  
                              2-character code  
                              Mandatory

**Coding Instructions:** Place RC in the first delimited field.

#### **Business Rules:**

##### Common Rules

1. Transaction Type is mandatory

##### **Error Messages:**

1. Transaction Type is Required.
2. Transaction Type must be in TRANSACTION\_TYPES table in database.

##### **Error Messages:**

1. Invalid Transaction Type.

##### Insert Rules

None.

##### Update Rules

None.

##### Delete Rules

None.

### 6.1.2 Action Code

**Description:** Indicates the data manipulation action to be performed by the transaction.

**Attributes:** Alphanumeric  
1-character code  
Mandatory

**Coding Instructions:** Place the values I, U, or D in the second delimited field.  
I - Insert a new row into the appropriate table in the database.  
U - Change one or more column values for an existing row in one or more tables.  
D - Delete a row from a table(s) for the row containing the key data.

#### Business Rules

##### Common Rules

1. Action Code is required.  
**Error Messages:**
  1. Action Code is Required.
2. Action Code must be either 'I', 'U', or 'D'..  
**Error Messages:**
  1. Invalid Action Code.

##### Insert Rules

None.

##### Update Rules

None.

##### Delete Rules

None.

### 6.1.3 State Code

**Description:** A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

**Attributes:** Alphanumeric  
2-character code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid FIPS state code in delimited field 3. A code is valid if it exists in the States Table.

## **Business Rules**

### Common Rules:

1. State Code is mandatory.  
**Error Messages:**
  1. State Code is required.
2. A Site with (State Code, County Code, Site ID) must be in the SITES table  
**Error Messages:**
  1. Invalid Site..
  2. No data found.

### Insert Rules:

None.

### Update Rules:

None.

### Delete Rules:

None.

## **6.1.4 County Code**

**Description:** A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

**Attributes:** Alphanumeric  
3-digit code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid county code in the fourth delimited field. A code is valid if it exists in combination with state code and city code, in the County Cities Table.

## **Business Rules**

### Common Rules:

1. County Code is required.  
**Error Messages:**
  1. County Code is required.
2. A Site with (State Code, County Code, Site ID) must be in the SITES table  
**Error Messages:**
  1. Invalid Site..
  2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

### 6.1.5 Site ID

**Description:** A numeric identifier (ID) that uniquely identifies each air monitoring site within a county.

**Attributes:** Alphanumeric  
4-digit ID  
Mandatory  
Key Field

**Coding Instructions:** Place a four-digit numeric code in the fifth delimited field. For update and delete, a site ID value is valid if it exists in combination with state code and county code in the Sites Table.

#### Business Rules

Common Rules:

1. Site ID is mandatory.

**Error Messages:**

1. Site ID is required.

2. Site ID must be exactly 4 digits.

**Error Messages:**

1. Invalid Site ID length

3. (State Code, County Code, Site ID) must be in the SITES table.

**Error Messages:**

1. Invalid Site..
2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

### 6.1.6 Parameter

**Description:** The code assigned to the parameter measured by the monitor.  
Parameters may be pollutants or non-pollutants.

**Attributes:** Alphanumeric  
5-digit code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid parameter code in the sixth delimited field. A parameter value is valid if it exists in combination with state code, county code, site ID, and POC in the Monitors Table.

#### Business Rules

##### Common Rules

1. Parameter Code is Mandatory.

**Error Messages:**

1. Parameter Code is required.
2. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database..

**Error Messages:**

1. Monitor ID (State, County, Site, Parameter, POC) not in database.

##### Insert Rules

None.

##### Update Rules

None.

##### Delete Rules

None.

### 6.1.7 POC (Parameter Occurrence Code)

**Description:** The code used to distinguish between multiple monitors at the same site that are measuring the same parameter.

**Attributes:** Numeric  
2-digit code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid POC value in the seventh delimited field. A POC value is valid if it is between 1 and 99.

**Business Rules**Common Rules

1. POC is Mandatory.  
**Error Messages:**
  1. POC is required.
2. POC must be a number between 1 and 99..  
**Error Messages:**
  1. Check constraint (AIRSRAQS.AVCON\_632937\_POC\_000) violated.
3. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database..  
**Error Messages:**
  1. Monitor ID (State, County, Site, Parameter, POC) not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

**6.1.8 Unit**

- Description:** The dimensional system in which the pollutant concentration or parameter reading is expressed.
- Attributes:** Alphanumeric  
3-digit code  
Mandatory
- Coding Instructions:** Place a valid unit code in the eighth delimited field. A unit value is valid if it exists in the Units Table and if it exists in combination with a sample duration of C, parameter, method, and composite type in the Protocols Table.

**Business Rules**Common Rules

1. The combination of (Parameter, Composite Type, Unit, and Method) must be in PROTOCOLS table.  
**Error Messages:**
  1. Invalid Protocol.



Insert Rules

1. Unit is required

**Error Messages:**

1. Unit is required.

Update Rules

None.

**Delete Rules**

None.

**6.1.9 Method**

**Description:** Identifies a particular method for collecting and analyzing samples of the monitor's parameter.

**Attributes:** Alphanumeric  
3-digit code  
Mandatory

**Coding Instructions:** Place a valid method code in the ninth delimited field. A method value is valid if it exists in combination with parameter in the Sampling Methodologies Table, and if it exists in combination with the duration code of C, unit, and composite type in the Protocols Table.

**Business Rules**Common Rules

1. The combination of (Parameter, Composite Type, Unit, and Method) must be in PROTOCOLS table.

**Error Messages:**

1. Invalid Protocol.

Insert Rules

1. Method is required.

**Error Messages:**

1. Method is required..

Update Rules

None.

Delete Rules

None.

---

**6.1.10 Year**

**Description:** The calendar year for which the observation was reported.

**Attributes:** Date  
4-digit year (yyyy)  
Mandatory  
Key Field

**Coding Instructions:** Place a valid year in the tenth delimited field. A year value is valid if it is in the form of YYYY, it is between 1957 and the current year, and there is valid sample period defined for the monitor in that year.

**Business Rules**Common Rules

1. Year is Required.  
**Error Messages:**
  1. Year is Required.
2. Year must be in the format 'YYYY'.  
**Error Messages:**
  1. Invalid Year.
3. Year must be less than, or equal to, the current year..  
**Error Messages:**
  1. Date must be less than current date.
4. Year must be greater or equal to the earliest supported year..  
**Error Messages:**
  1. The sample date is not within an available year.
5. Year and Period must fall within a valid sample period for the monitor .  
**Error Messages:**
  1. Monitor is inactive for this date..
6. Year and Period must fall within a valid monitor type assignment period for the monitor.  
**Error Messages:**
  1. Attempt to add data for which there is no corresponding Monitor Type Date Range.
7. If Parameter is a criteria pollutant, the Year and Period must fall within an agency role assignment of type "REPORTING" for the monitor..  
**Error Messages:**
  1. There is no active reporting agency for this date.

Insert Rules

1. Composite data must not already exist in the database for the combination of Year and Period for the Monitor.

**Error Messages:**

1. Attempted to insert a value for an existing date and time.

Update Rules

1. Composite data must exist in the database for the combination of Year and Period for the Monitor

**Error Messages:**

1. Production record doesn't exist to update or delete

Delete Rules

1. Composite data must exist in the database for the combination of Year and Period for the Monitor.

**Error Messages:**

1. Production record doesn't exist to update or delete.

**6.1.11 Period**

**Description:** Indicates the time period within the year to which the observation applies. It is expressed in units that may be inferred from composite type.

**Attributes:** Alphanumeric  
2-digit code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid period code in the eleventh delimited field. A period code is valid if it falls within the minimum and maximum period defined for composite type in the Composite Types Table.

Valid period codes depend on composite type as follows:

Comp Type	Valid Period Code
1 (Quarterly)	01-04
2 (Seasonal)	01-04
3 (Monthly)	01-12
4 (Weekly)	01-53
5 (Annually)	01

**Business Rules****Common Rules**

1. Period is Required.  
**Error Messages:**
  1. Period is Required.
2. Period must be an integer with value between the MIN\_PERIOD and MAX\_PERIOD defined in the COMPOSITE\_TYPES table for the Composite Type.  
**Error Messages:**
  1. Invalid Period for the Composite Type.
3. The date corresponding to the Year and Period must be less than, or equal to, the current date.  
**Error Messages:**
  1. Date must be less than current date.
4. Year and Period must fall within a valid sample period for the monitor .  
**Error Messages:**
  1. Monitor is inactive for this date..
5. Year and Period must fall within a valid monitor type assignment period for the monitor.  
**Error Messages:**
  1. Attempt to add data for which there is no corresponding Monitor Type Date Range.
6. If Parameter is a criteria pollutant, the Year and Period must fall within an agency role assignment of type "REPORTING" for the monitor..  
**Error Messages:**
  1. There is no active reporting agency for this date.

**Insert Rules**

1. Composite data must not already exist in the database for the combination of Year and Period for the Monitor.  
**Error Messages:**
  1. Attempted to insert a value for an existing date and time.

**Update Rules**

1. Composite data must exist in the database for the combination of Year and Period for the Monitor  
**Error Messages:**
  1. Production record doesn't exist to update or delete

Delete Rules

1. Composite data must exist in the database for the combination of Year and Period for the Monitor.

**Error Messages:**

1. Production record doesn't exist to update or delete.

**6.1.12 Number of Samples**

**Description:** Indicates the number of samples that were combined to yield the composite sample value.

**Attributes:** Alphanumeric  
10-digit number  
Mandatory

**Coding Instructions:** Place a valid number of samples in the twelfth delimited field. A number of samples value is valid if it is greater than 0 and is less than the maximum number of samples defined for composite type in the Composite Types Table.

**Business Rules**Common Rules

1. Number of samples must be a positive integer..

**Error Messages:**

1. Invalid sample count.
  2. Number of Samples must be less than or equal to the maximum count defined for Composite Type.
- Error Messages:**
1. The sample count exceeds the maximum allowed for the composite type.

Insert Rules

1. Number of Samples is required.

**Error Messages:**

1. Number of Samples is required.

Update Rules

None.

Delete Rules

None.

**6.1.13 Composite Type**

**Description:** Indicates the time period over which samples are composited or the frequency of submitting composite samples.

**Coding Instructions:** Place a valid composite type term in the thirteenth delimited field. A composite type value is valid if it exists in the Composite Types Table, it exists in combination with parameter, method, sample duration equal to C, and unit in the Protocols Table.

## Business Rules

### Common Rules

1. Composite Type is required..  
**Error Messages:**
  1. Composite Type is required..
2. Composite Type must exist in the COMPOSITE\_TYPES table..  
**Error Messages:**
  1. Invalid Composite Type.
3. Composite Type must be at production status..  
**Error Messages:**
  1. Status of Composite Type is inactive.
4. The combination of (Parameter, Composite Type, Unit, and Method) must be in PROTOCOLS table.  
**Error Messages:**
  1. Invalid Protocol.
5. Composite Type must not be different than the one used for any other composite data for the monitor in the year.  
**Error Messages:**
  1. Composite Type may only change for first sample of year.

### Insert Rules

None.

### Update Rules

None.

### Delete Rules

None.

## 6.1.14 Sample Value

**Description:** The value of a composite observation.

**Attributes:** Numeric  
10 digits, including 5 decimal places (nnnnn.nnnnn)  
Mandatory

**Coding Instructions:** Place the sample value in the thirteenth delimited field. Reported scale

is implied from the number of digits allocated to the right of the decimal point. For example, to submit the value of 1.2 in the scale of 3, then submit the value as 1.200.

For some parameters, upper and lower limits have been established for observations. The sample value is compared to these limits, if they exist on the Parameters Table for the pollutant. If the sample value falls outside the range defined by the absolute max sample value and the absolute min sample value, and there is no qualifier entered with the sample value, then the sample value will be rejected with an error message.

Lead (12128) is the only parameter that is reported as a composite observation (duration code = C), and that has an absolute maximum sample value defined on the Parameters Table. The relevant maximum values for lead composite observations are listed below:

Para-meter	Code	Units	Abs Max Sample Value	Abs Min Sample Value	Fed Rel Max Sample Value	Fed Rel Min Sample Value
Lead	12128	µg/m <sup>3</sup> (25 C)	200	0	100	0

If the sample falls outside the range defined by the Federal relative maximum sample value and Federal relative minimum sample value, and there is not qualifier entered with the sample value, then the sample will not be rejected, but will be highlighted in the Statistical Critical Review Report with a warning message.

## Business Rules

### Common Rules

1. Sample Value must be a number with no more than 5 digits before or after the decimal point..

#### **Error Messages:**

1. Invalid numeric format.
2. Sample Value, when converted to standard units, must fall within the absolute value range defined for the parameter.

#### **Error Messages:**

1. Standard value falls outside absolute value range for the parameter.

### Insert Rules

None.

### Update Rules

---

None.

Delete Rules

None.

### 6.1.15 Monitor Protocol ID

**Description:** The sequential monitor protocol identification (MP ID) number used to distinguish combinations of sample duration, unit, method, collection frequency, composite type, and alternate method detectable limit for a monitor.

**Attributes:** Numeric  
2 digits (nn)  
Optional

**Coding Instructions:** Place a valid MP ID number in the fifteenth delimited field. An MP ID value is valid if it exists in the Monitor Protocols Table for the monitor. (Note: it is only necessary to provide this value if an Alternate MDL applies to the sample value; otherwise, the appropriate monitor protocols can be derived.)

#### Business Rules

Common Rules

1. The MP ID must exist in the database for the monitor..

**Error Messages:**

1. Invalid MP\_ID.
2. MP ID and Alt MDL may not be specified at the same time..
- Error Messages:**
1. MP\_ID and Alt MDL may not both be specified.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 6.1.16 Qualifier 1-10

**Description:** Qualifications used to describe the composite raw data. They may document exceptional data or quality assurance exceptions.

**Attributes:** Alphanumeric  
1- or 2-character code



Optional

**Coding Instructions:** Ten fields (delimited fields 16-25), are allocated for the designation of composite data qualifiers. It is valid to designate one, and only one, exceptional data qualifier, and as many quality assurance qualifiers as are necessary. To designate qualifiers, use the available fields in sequence: place the first qualification in field 16, the second in field 17, and so on. A particular qualifier value is valid if it exists in the Qualifiers Table.

**Business Rules**

Common Rules

1. Qualifier must be in QUALIFIERS table.

**Error Messages:**

1. Integrity constraint (AIRSRAQS.QD\_QU\_FK) violated
2. QUALIFIERS (QUALIFIER\_CODE) must be at production status.

**Error Messages:**

1. Invalid Raw Data Qualifier.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

**6.1.17 Alternate Method Detectable Limit (Alt MDL)**

**Description:** Alternate Method detectable limit is the minimum detectable level defined for the monitor and method. It can be supplied by the reporting agency to supercede the Federal Method Detectable Limit for the Method.

**Attributes:** Numeric  
10 digits, including 5 decimal places (nnnnn.nnnnn)  
Optional

**Coding Instructions:** Place a valid Alt MDL in the 26<sup>th</sup> delimited field. A user can report an Alt MDL on the composite raw data (RC) transaction, or leave it blank. If it is reported on the composite raw data transactions, then the software looks to see whether it is a new Alt MDL value (i.e., does not exist on the Monitor Protocol Table). If it is a new value, a new monitor protocol record is system-generated and that new MP ID number is stored with the raw data value.

If the reported Alt MDL value is not a new value, and there is already a monitor protocol record for that monitor and Alt MDL, then the existing MP ID from the Monitor Protocols Table is stored with the raw data value.

Another way of reporting a new Alt MDL is to create a new monitor protocol with the new value using the MK transaction. Then the raw data transactions can reference the new monitor protocol via the MP\_ID and the Alt MDL value is not needed.

## **Business Rules**

### Common Rules

1. Alt MDL must be a positive number with no more than 5 digits before or after the decimal point.

#### **Error Messages:**

1. Invalid Alt MDL.
2. MP ID and Alt MDL may not be specified at the same time..

#### **Error Messages:**

1. MP\_ID and Alt MDL may not both be specified.

### Insert Rules

None.

### Update Rules

None.

## **6.1.18 Uncertainty**

**Description:** The measure of method uncertainty associated with the sample data point, which will include components of both the analytical and the volume uncertainty. No blank corrections are assumed (other than laboratory baseline corrections which are an integral part of each analysis).

**Attributes:** Numeric  
10 digits, including 5 decimal places (nnnnn.nnnnn)

### **Coding Instructions:**

## **Business Rules**

### Common Rules

1. Uncertainty must be a positive number with no more than 5 digits before or after the decimal point..

#### **Error Messages:**

1. Invalid Uncertainty.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

## 6.2 Hourly, Daily, Sub-Hourly Raw Data - Transaction Type RD

The type RD transaction is used for individual parameter observations. See the data input transaction formats in the Appendices for a list of required fields on each transaction format.

An insert transaction is used to insert observations or qualifiers into the database where neither currently exists. An update transaction is used to change or delete existing observations or missing value reason codes. A delete transaction is used to remove all the existing observations and missing value reason codes within the temporal scope of the transaction.

### Transaction Level Rules and Errors

1. Raw data linked to collocated precision checks may not be updated or deleted.

#### Error Messages:

1. Raw data that are part of collocated precision checks may not be updated or deleted.

### 6.2.1 Transaction Type

**Description:** Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

**Attributes:** Alphanumeric  
2-character code  
Mandatory

**Coding Instructions:** Place RD in the first delimited field.

### Business Rules:

#### Common Rules

1. Transaction Type is mandatory

#### Error Messages:

1. Transaction Type is Required.
2. Transaction Type must be in TRANSACTION\_TYPES table in database.

#### Error Messages:

1. Invalid Transaction Type.

#### Insert Rules

None.

#### Update Rules

None.

#### Delete Rules

---

None.

### 6.2.2 Action Code

**Description:** Indicates the data manipulation action to be performed by the transaction.

**Attributes:**           Alphanumeric  
                          1-character code  
                          Mandatory

**Coding Instructions:** Place the values I, U, or D in the second delimited field.  
I - Insert a new row into the appropriate table in the database.  
U - Change one or more column values for an existing row in one or more tables.  
D - Delete a row from a table(s) for the row containing the key data.

#### Business Rules

##### Common Rules

1. Action Code is required.

**Error Messages:**

1. Action Code is Required.
  2. Action Code must be either 'I', 'U', or 'D'..
- Error Messages:**
1. Invalid Action Code.

##### Insert Rules

None.

##### Update Rules

None.

##### Delete Rules

None.

### 6.2.3 State Code

**Description:** A FIPS code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

**Attributes:**           Alphanumeric  
                          2-character code  
                          Mandatory  
                          Key Field

**Coding Instructions:** Place a valid FIPS state code in delimited field 3. A code is valid if it exists in the States Table.

**Business Rules**Common Rules:

1. State Code is mandatory.  
**Error Messages:**
  1. State Code is required.
2. A Site with (State Code, County Code, Site ID) must be in the SITES table  
**Error Messages:**
  1. Invalid Site..
  2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

**6.2.4 County Code**

**Description:** A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

**Attributes:** Alphanumeric  
3-digit code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid county code in the fourth delimited field. A code is valid if it exists in combination with state code and city code, in the County Cities Table.

**Business Rules**Common Rules:

1. County Code is required.  
**Error Messages:**
  1. County Code is required.
2. A Site with (State Code, County Code, Site ID) must be in the SITES table  
**Error Messages:**
  1. Invalid Site..
  2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

### 6.2.5 Site ID

**Description:** A numeric identifier (ID) that uniquely identifies each air monitoring site within a county.

**Attributes:**           Alphanumeric  
                              4-digit ID  
                              Mandatory  
                              Key Field

**Coding Instructions:** Place a four-digit numeric code in the fifth delimited field. For update and delete, a site ID value is valid if it exists in combination with state code and county code in the Sites Table.

**Business Rules**Common Rules:

1. Site ID is mandatory.

**Error Messages:**

1. Site ID is required.

2. Site ID must be exactly 4 digits.

**Error Messages:**

1. Invalid Site ID length

3. (State Code, County Code, Site ID) must be in the SITES table.

**Error Messages:**

1. Invalid Site..
2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

### 6.2.6 Parameter

**Description:** The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

**Attributes:** Alphanumeric  
5-digit code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid parameter code in the sixth delimited field. A parameter value is valid if it exists in combination with state code, county code, site ID, and POC in the Monitors Table.

#### Business Rules

##### Common Rules

1. Parameter Code is Mandatory.

**Error Messages:**

1. Parameter Code is required.
2. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database..

**Error Messages:**

1. Monitor ID (State, County, Site, Parameter, POC) not in database.

##### Insert Rules

None.

##### Update Rules

None.

##### Delete Rules

None.

### 6.2.7 POC (Parameter Occurrence Code)

**Description:** An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter.

**Attributes:** Numeric  
2-digit ID  
Mandatory  
Key Field

**Coding Instructions:** Place a valid POC value in the seventh delimited field. A POC value is valid if it is between 1 and 99.



**Business Rules**Common Rules

1. POC is Mandatory.  
**Error Messages:**
  1. POC is required.
2. POC must be a number between 1 and 99..  
**Error Messages:**
  1. Check constraint (AIRSRAQS.AVCON\_632937\_POC\_000) violated.
3. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database..  
**Error Messages:**
  1. Monitor ID (State, County, Site, Parameter, POC) not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

**6.2.8 Sample Duration**

**Description:** The period of time during which the raw sample value was collected.

**Attributes:** Alphanumeric  
1-character code  
Mandatory

**Coding Instructions:** Place a valid sample duration code in the eighth delimited field. A sample duration value is valid if it exists in the Sample Durations Table and if it exists in combination with unit, parameter, method, and collection frequency in the Protocols Table.

**Business Rules**Common Rules

1. The combination of (Sample Duration, Unit, Parameter, and Method) must be in PROTOCOLS table.  
**Error Messages:**
  1. Invalid Protocol.

- 
2. Sample duration must be an observed rather than a computed duration..  
**Error Messages:**
    1. Raw data must be submitted with an observed duration.
  3. Sample Duration must not be different than the one used for any other raw data for the monitor in the year.  
**Error Messages:**
    1. Duration Code does not match the annual summary duration.

**Insert Rules**

1. Sample Duration is required..  
**Error Messages:**
  1. Sample Duration is required..

**Update Rules**

None.

**Delete Rules**

None.

**6.2.9 Unit**

- Description:** The dimensional system in which the pollutant concentration or parameter reading is expressed.
- Attributes:** Alphanumeric  
3-digit code  
Mandatory
- Coding Instructions:** Place a valid unit code in the ninth delimited field. A unit value is valid if it exists in the Units Table and if it exists in combination with parameter, sampling duration, method, and collection frequency in the Protocols Table.

**Business Rules****Common Rules**

1. The combination of (Sample Duration, Unit, Parameter, Method, and Sampling Frequency) must be in PROTOCOLS table.  
**Error Messages:**
  1. Invalid Protocol.

**Insert Rules**

1. Unit is required  
**Error Messages:**
  1. Unit is required.

Update Rules

None.

Delete Rules

None.

## 6.2.10 Method

**Description:** Identifies a particular method for collecting and analyzing samples of the monitor's parameter.

**Attributes:** Alphanumeric  
3-digit code  
Mandatory

**Coding Instructions:** Place a valid method code in the tenth delimited field. A method code is valid if it exists in combination with parameter in the Sampling Methodologies Table, and if it exists in combination with parameter, sampling duration, units, and collection frequency in the Protocols Table.

### Business Rules

Common Rules

1. The combination of (Sample Duration, Unit, Parameter, Method, and Sampling Frequency) must be in PROTOCOLS table.

**Error Messages:**

1. Invalid Protocol.

Insert Rules

1. Method is required.

**Error Messages:**

1. Method is required..

Update Rules

None.

Delete Rules

None.

## 6.2.11 Date

**Description:** The calendar date for which the observation is being reported.

**Attributes:** Date  
8-digit date  
Mandatory  
Key Field

**Coding Instructions:** Place a valid date in the eleventh delimited field. A date value is valid if it is in the form of YYYYMMDD, it is between 1957 and the current year, and it falls within a valid sample period defined for the monitor.

## **Business Rules**

### Common Rules

1. Date is required.  
**Error Messages:**
  1. Date is required.
2. Date must be in a year greater or equal to the earliest supported year  
**Error Messages:**
  1. The sample date is not within an available year
3. Date must be less than, or equal to, the system date.  
**Error Messages:**
  1. Date must be less than current date.
4. Date must fall within a valid sample period for the monitor.  
**Error Messages:**
  1. Monitor inactive for this date.
5. Date must fall within a valid monitor type assignment period for the monitor .  
**Error Messages:**
  1. Attempt to add data for which there is no corresponding Monitor Type Date Range
6. If Parameter is a criteria pollutant, Date must fall within a valid reporting organization period for the monitor .  
**Error Messages:**
  1. No active reporting.agency for this date.
7. If Parameter is a criteria PM pollutant, Date must fall within a valid required collection frequency period for the monitor..  
**Error Messages:**
  1. No Required Collection Frequency defined for this monitor-date..

### Insert Rules

1. A pre-production raw data value must not already be in the database for the Monitor, Date, and Time.  
**Error Messages:**
  1. Unique constraint (AIRSRAQS.ACA\_ACCDET\_FK) violated.

2. Date and Start Time for the sample may not fall within the duration period of the sample immediately preceding it, not span into the duration period of the sample immediately succeeding it..

**Error Messages:**

1. Sample duration overlaps immediately preceding or succeeding sample value.

Update Rules

1. A production raw data value must be in the database for the Monitor, Date, and Time.

**Error Messages:**

1. Production record doesn't exist to update or delete.

Delete Rules

1. A production raw data value must be in the database for the Monitor, Date, and Time.

**Error Messages:**

1. Production record doesn't exist to update or delete..

## 6.2.12 Start Time

**Description:** Indicates the beginning of the sampling period in standard time at the location of the monitoring site.

**Attributes:**           Alphanumeric  
                              5 characters  
                              Mandatory  
                              Key Field

**Coding Instructions:** Place a valid start time in the twelfth delimited field. A start time value is valid if it is in the format of HH:MM, and does not overlap another sampling period for the monitor, based on Sample Duration.

### Business Rules

Common Rules

1. Start Time is required..

**Error Messages:**

1. Start Time is required..

2. Start time must be in the format: HH:MM..

**Error Messages:**

1. Invalid time format.

Insert Rules

1. A pre-production raw data value must not already be in the database for the Monitor, Date, and Time.

**Error Messages:**

1. Unique constraint violated.

2. Date and Start Time for the sample may not fall within the duration period of the sample immediately preceding it, not span into the duration period of the sample immediately succeeding it..

**Error Messages:**

1. Sample duration overlaps immediately preceding or succeeding sample value

Update Rules

1. A production raw data value must be in the database for the Monitor, Date, and Time.

**Error Messages:**

1. Production record doesn't exist to update or delete.

Delete Rules

1. A production raw data value must be in the database for the Monitor, Date, and Time.

**Error Messages:**

1. Production record doesn't exist to update or delete..

### 6.2.13 Sample Value

**Description:** The value of an observation being reported.

**Attributes:** Numeric  
10 digits, including 5 decimal places (nnnnn.nnnnn)  
Optional

**Coding Instructions:** Place the sample value in the thirteenth delimited field. Reported scale is implied from the number of digits allocated to the right of the decimal point. For example, to submit the value of 1.2 in the scale of 3, then submit the value as 1.200.

For some parameters, upper and lower limits have been established for observations. The sample value is compared to these limits, if they exist on the Parameters Table for the pollutant. If the sample value falls outside the range defined by the absolute max sample value and the absolute min sample value, and there is no qualifier entered with the sample value, then the sample value will be rejected with an error message.

If the sample falls outside the range defined by the Federal relative maximum sample value and Federal relative minimum sample value, and there is not qualifier entered with the sample value, then the sample will not be rejected, but will be highlighted in the Statistical Critical Review Report with a warning message.

The relevant maximum values and parameters are listed below:

Parameter Code	Parameter Description	Abs Max Sample Value	Abs Min Sample Value	Fed Rel Max Sample Value	Fed Rel Min Sample Value	Unit
11101	Suspended Particulate (TSP)	10000	0	1000	0	µg/meter <sup>3</sup> (25 c)
12128	Lead (TSP)	200	0	100	0	µg/meter <sup>3</sup> (25 c)
42101	Carbon Monoxide	150	0	75	0	parts per million (ppm)
42401	Sulfur Dioxide	5	0	1	0	ppm
42601	Nitric Oxide	5	0	1	0	ppm
42602	Nitrogen Dioxide	3	0	1	0	ppm
42603	Oxides of Nitrogen	5	0	1.5	0	ppm
43101	Total Hydrocarbons	99999	0	10000	0	parts per billion carbon
43102	Total NMOC	20000	0	10000	0	parts per billion carbon
43201	Methane	99999	0			parts per billion carbon
44201	Ozone	0.7	0	0.4	0	pm
61102	Wind Direction	360	0	360	0	degrees, compass
61104	Resultant Direction	360	0	360	0	degrees, compass
61106	Std Dev Hz Wind Dir	360	0	360	0	degrees, compass
61107	Std Dev Vt Wind Dir	360	0	360	0	degrees, compass
61112	Vert Wind Direction	360	0	360	0	degrees, compass
62101	Outdoor Temperature	150	-60			degrees, Fahrenheit
62102	Virtual Temperature	150	-60			degrees, Fahrenheit

Parameter Code	Parameter Description	Abs Max Sample Value	Abs Min Sample Value	Fed Rel Max Sample Value	Fed Rel Min Sample Value	Unit
62104	Temperature 24-Hour Max	150	-60			degrees, Fahrenheit
62105	Temperature 24-Hour Min	150	-60			degrees, Fahrenheit
62107	Indoor Temperature	150	-60			degrees, Fahrenheit
62201	Relative Humidity	100	0			percent rel humidity
68101	Sample Flow Rate - CV	20	0	20	0	percent
68102	Sample Volume	25.2	8			cubic meter
68103	Ambient Min Temperature	55	-40	55	-40	degrees, centigrade
68104	Ambient Max Temperature	55	-40	55	-40	degrees, centigrade
68105	Ambient Avg Temperature	55	-40	55	-40	degrees, centigrade
68106	Sample Min Barometric Pressure	850	450	850	450	millimeters (mercury)
68107	Sample Max Barometric Pressure	850	450	850	450	millimeters (mercury)
68108	Sample Avg Barometric Pressure	850	450	850	450	millimeters (mercury)
68109	Elapsed Sample Time	1500	480			minutes
81102	PM-10 Total 0-10 Um	5000	-10	500	-10	µg/cubic meter (25 c)
88101	PM-2.5 Local Conditions	5000	-10	500	-10	µg/cubic meter (LC)

## Business Rules

### Common Rules

1. Sample Value must be a number with no more than 5 digits before or after the decimal point..

### Error Messages:

1. Invalid numeric format.



2. Sample Value must be valued if Null Data Code is not valued, and must not be valued if Null Data Code is valued..

**Error Messages:**

1. The null data qualifier code or the reported sample value must exist.
3. Sample Value, when converted to standard units, must fall within the absolute value range defined for the parameter.

**Error Messages:**

1. Standard value falls outside absolute value range for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

## 6.2.14 Null Data Code

**Description:** Code to explain why no sample value was reported.

**Attributes:**           Alphanumeric  
                          2-character code  
                          Optional

**Coding Instructions:** Place a valid null value code in the fourteenth delimited field. A null data code value is valid if it exists in the Qualifiers Table with the qualifier type of null.

**Business Rules**Common Rules

1. Null Data Code must be valued if Sample Value is not valued, and must not be valued if Sample Value is valued.

**Error Messages:**

1. The null data qualifier code or the reported sample value must exist.
2. Null Data Code must be in QUALIFIERS table..

**Error Messages:**

1. Integrity constraint (AIRSRAQS.QD\_QU\_FK) violated.

3. Null Data Code must be at production status.

**Error Messages:**

1. Invalid Raw Data Qualifier

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 6.2.15 Collection Frequency

**Description:** Indicates the elapsed time period between observations.

**Attributes:**           Alphanumeric  
                          1- or 2-digit code  
                          Optional

**Coding Instructions:** Place a valid collection frequency code in the fifteenth delimited field. A collection frequency is required only for PM-10 and PM-2.5. For hourly data, leave collection frequency blank. A collection frequency value is valid if it exists in the Collection Frequencies Table, and if it exists in combination with parameter, method, sample duration, and unit in the Protocols Table.

#### Business Rules

Common Rules

1. The combination of (Sample Duration, Unit, Parameter, Method, and Sampling Frequency) must be in PROTOCOLS table.

**Error Messages:**

1. Invalid Protocol.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 6.2.16 Monitor Protocol ID

**Description:** The sequential monitor protocol identification (MP ID) number used to distinguish combinations of sample duration, unit, method, collection frequency, composite type, and alternate method detectable limit for a monitor.

**Attributes:** Numeric  
2 digits (nn)  
Optional

**Coding Instructions:** Place a valid MP ID number in the sixteenth delimited field. An MP ID value is valid if the MP ID Value exists in the monitor Protocols Table for the monitor. (Note: it is only necessary to provide this value if an Alternate MDL applies to the sample value; otherwise, the appropriate monitor protocols can be derived.)

### **Business Rules**

#### Common Rules

1. The MP ID must exist in the database for the monitor..  
**Error Messages:**
  1. Invalid MP\_ID.
2. MP ID and Alt MDL may not be specified at the same time..  
**Error Messages:**
  1. MP\_ID and Alt MDL may not both be specified.

#### Insert Rules

None.

#### Update Rules

None.

#### Delete Rules

None.

## **6.2.17 Qualifier 1-10**

**Description:** Qualifications used to describe the composite raw data. They may document exceptional data, or quality assurance exceptions.

**Attributes:** Alphanumeric  
1- or 2-character code  
Optional

**Coding Instructions:** Ten fields (delimited fields 17-26), are allocated for the designation of raw data qualifiers. It is valid to designate one, and only one, exceptional data qualifier, and as many quality assurance qualifiers as are necessary. To designate qualifiers, use the available fields in sequence: place the first qualification in field 17, the second in field 18, and so on. A particular qualifier value is valid if it exists in the Qualifiers Table.

### **Business Rules**

Common Rules

1. Qualifier must be in QUALIFIERS table.  
**Error Messages:**
  1. Integrity constraint (AIRSRAQS.QD\_QU\_FK) violated
2. QUALIFIERS (QUALIFIER\_CODE) must be at production status.  
**Error Messages:**
  1. Invalid Raw Data Qualifier.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

**6.2.18 Alternate Method Detectable Limit (Alt MDL)**

**Description:** Alternate Method Detectable Limit is the minimum detectable level defined for the monitor and method.

**Attributes:** Numeric  
10 digits, including 5 decimal places (nnnnn.nnnnn)  
Optional

**Coding Instructions:** Place a valid Alt MDL in the 27<sup>th</sup> delimited field. A user can report Alt MDL on the Hourly, Daily, Sub-Hourly Raw Data (RD) transaction, or leave it blank. If it is reported on the raw data transactions, then the software looks to see whether it is a new Alt MDL value (i.e., does not exist on the Monitor Protocol Table). If it is a new value, a new monitor protocol record is system-generated and that new MP ID number is stored with the raw data value.

If the reported MDL value is not a new value, and there is already a monitor protocol record for that monitor and Alt MDL, then the existing MP ID from the Monitor Protocol Table is stored with the raw data value.

Another way of reporting a new MDL is to create a new monitor protocol with the new value using the MK transaction. Then the raw data transactions can reference the monitor protocol record and the Alt MDL value is not needed.

**Business Rules**Common Rules

1. Alt MDL must be a positive number with no more than 5 digits before or after the decimal point.

**Error Messages:**

1. Invalid MDL.
2. MP ID and Alt MDL may not be specified at the same time..

**Error Messages:**

1. MP\_ID and Alt MDL may not both be specified.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

**6.2.19 Uncertainty****Description:**

**Attributes:** Numeric  
10 digits, including 5 decimal places (nnnnn.nnnnn)

**Coding Instructions:****Business Rules**Common Rules

1. Uncertainty must be a positive number with no more than 5 digits before or after the decimal point..

**Error Messages:**

1. Invalid Uncertainty.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

## 6.3 Statistical Tests

The pattern and gap tests performed on hourly data (duration of 1) are described briefly below. See EPA document Screening Procedures for Ambient Air Quality for more detailed information (publication # EPA-450/2-78-037, July 1978). The values are validated via the following statistical tests, and results are included in the Statistical Critical Review Report for user review prior to posting as production data.

### 6.3.1 Pattern Tests

Pattern tests are performed on hourly data for pollutants 44201 ozone (O<sub>3</sub>), 42101 carbon monoxide (CO), 42401 sulfur dioxide (SO<sub>2</sub>), and 42602 nitrogen dioxide (NO<sub>2</sub>). Exceptional event data are excluded from the tests. The tests are run on a month of hourly data. Essentially, each test scans the month's values and compares them against empirically derived thresholds to determine if they are questionable. If so, the value is flagged as failing that particular test. The raw data values are converted to the appropriate units before the tests are applied. The factors used to convert from reporting units to the units of the tests are given in Table 6-1. The threshold values for each pollutant and each test are listed in Table 6-2. As that Table shows, different threshold values pertain depending on the season of the year and the time of day.

The Dixon test (not applied to CO) scans each day's values and determines the highest, second highest, and lowest values in that day. It then computes the Dixon ratio, defined as  $(\text{max} - \text{secmax})/(\text{max} - \text{low})$ . If this value is greater than 0.55, the day fails the Dixon test and all hours are marked as failing.

The max hour test compares each value in the month to a constant to determine if the value is too high. If so, it is marked as failing.

The high difference test compares the value at each hour in the month to the previous hour and the subsequent hour. If the difference between any two hours is greater than allowable, then the hour under inspection is marked as failing.

The spike test works much like the high difference test, except that both differences must be greater than allowable for the test to fail. Also, the percentage difference between the hour in question and both its adjacent hours must be greater than allowable for the test to fail. If either the difference or the percentage comparison fails, the value is rejected.

The high consecutive values test looks at each hour and the subsequent three hours. If all four values are greater than allowable, then all four hours are marked as failing the test.

**Table 6-1 Conversion Factors for the Pattern and Gap Tests**

Pollutant	Units for Gap and Pattern Tests	Reported Units	Conversion Factors
42101 (CO)	parts per million (ppm)	005 (mg/m <sup>3</sup> 25°) 006 (mg/m <sup>3</sup> 0°) 007 (ppm) 008 (ppb)	0.86957 0.79653 1.0 0.001
42401 (SO <sub>2</sub> )	pphm*	001 (µg/m <sup>3</sup> 25°) 002 (µg/m <sup>3</sup> 0°) 007 (ppm) 008 (ppb)	0.03817 0.03496 100.0 0.1
42602 (NO <sub>2</sub> )	pphm*	001 (µg/m <sup>3</sup> 25°) 002 (µg/m <sup>3</sup> 0°) 007 (ppm) 008 (ppb)	0.05319 0.04872 100.0 0.1
44201 (O <sub>3</sub> )	pphm*	001 (µg/m <sup>3</sup> 25°) 002 (µg/m <sup>3</sup> 0°) 007 (ppm) 008 (ppb)	0.05102 0.04673 100.0 0.1

\*ppm - parts per million, mg/m<sup>3</sup> - milligrams per cubic meter, ppb - parts per billion, pphm - parts per hundred million, µg/m<sup>3</sup> - micrograms per cubic meter

**Table 6-2 Threshold Values for the Pattern Tests**

Pollutant	Data Minimum Stratification	Maximum Hour Test	High Difference Test	Spike	Consecutive Values Test	Value*
Ozone (pphm)	Summer-Day Months: 05-10 Hours: 10-17	50	15	10 (300%)	26	5
	Summer-Night Months: 05-10 Hours: 18-09	38	10	5 (300%)	26	5
	Winter-Day Months: 11-04 Hours: 10-17	26	13	10 (300%)	26	5
	Winter-Night Months: 11-04 Hours: 18-09	15	10	5 (300%)	26	5
Carbon Monoxide (ppm)	Rush Traffic Hours: 06-10 06-20	65	22	17 (500%)	35	17
	Non-Rush Traffic Hours: 11-15 21-05	44	22	17 (500%)	35	17
Sulfur Dioxide (pphm)	Zone 1 Regions 1, 5, 6, 7	99	19	8 (500%)	38	25
	Zone 2 Regions 2, 3, 4	50	11	8 (500%)	38	25
	Zone 3 Regions 8, 9, 10	30	8	8 (500%)	38	25
Nitrogen Dioxide (pphm)	None	64	27	11 (300%)	53	12

\* Values below the minimum are excluded from the high difference and spike tests.



### 6.3.2 Gap Test

The gap test is performed on data for pollutants 44201 (O<sub>3</sub>), 42101 (CO), 42401 (SO<sub>2</sub>), and 42602 (NO<sub>2</sub>). Exceptional events data are excluded. The gap test is so named because it looks for gaps in the Frequency Distribution Table for a month's values. The test is run on a month of hourly data (duration of 1). For each pollutant, the program builds a Frequency Distribution Table and computes constants associated with the frequency distribution. If there is not enough data to compute the constants, a warning is issued. Having determined the constants, a largest reasonable gap is estimated. Then the largest actual gap in the data is determined and compared to the largest estimated gap to determine whether the month passes or fails the gap test.

### 6.3.3 Patterns and Gap Failure Report

The patterns and gap failure report is produced by the Critical Review (CR) statistics program. The report identifies the day in which a pattern test failed or the month in which the gap test failed, and it shows the first and last keys of the transactions involved in the failed test. Under the heading hourly values failing test(s)/test(s) failed, the report gives additional information to help identify the values that failed the test.

For pattern test failures, the report shows all the values for each day in which a value failed a test. If database values are being changed with update transactions, some of the values listed may be from the database and some from the transactions in the batch transaction file. One-letter codes under the values indicate which of the pattern tests a value failed. If a particular value failed more than one test, multiple codes are listed. The codes are:

- C High consecutive values test
- D Dixon test
- H High difference test
- M Max hour test
- S Spike test

The codes are also listed on each page of the reports as part of the page heading.

Determining which values are involved in a failure of the gap test is a bit more difficult. The gap test identifies a gap in the frequency distribution of a month's values. Often, but not always, the gap is due to an outlier, a value unusually higher or lower than the bulk of the data for the month. The patterns and gap failure report does not identify the date and hour of the value(s) failing the gap test, but it does give information that may allow manual identification of the values(s). Gap size is the difference in magnitude between the two values on either side of the gap in the frequency distribution, expressed in the units used for the gap test (ppm or pphm). Num above gap is the number of values above the gap. If the number of values is large, the gap is in the smallest values for the month. Finally, slot below gap is the value on the low end of the gap, expressed in the units of the test (ppm or pphm).

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### 6.3.4 Shewhart Test

The Shewhart test which is performed on daily data is described briefly herein. See EPA Document Screening Procedures for Ambient Air Quality for more detailed information (publication # EPA-450/2-78-037, July 1987).

The Shewhart test is performed on daily data (duration is 7, 24-hour) for pollutants 12128 (Pb), 42401 (SO<sub>2</sub>), 42602 (NO<sub>2</sub>), 88101 (PM-2.5), and 81102 (PM-10). Exceptional events data are excluded. The test is run on a month of daily data. The program counts the number of valid samples for the current month and each of the three previous months. If there is insufficient data to perform the test, a warning message is issued. Given sufficient data for at least two of the three previous months, the program computes the mean and range for the current month. It then computes the historical mean and range, from the mean and range of the data for the three historical months. The mean and range for the current month are compared against the historical values to determine whether the current month passes or fails the Shewhart test.

## **6.4 Critical Review Tests**

For monitors defined as SLAMS, NAMS, and PAMS, measurement data is identified as suspect, or considered for review, if it meets certain “Critical Review” conditions. This data is periodically examined by EPA headquarters personnel.

The specific tests are as follows:

### **6.4.1 Criteria Pollutants**

1. Any value that exceeds the 3-year historical maximum. The 3-year historical maximum is defined as the maximum non-exceptional event value obtained between the current year and the current year minus 3 years.
2. The first maximum of the dataset is 125% greater than second maximum on a per monitor-year basis.
3. Value exceeds of the NAAQS times the critical review factor located in the `state_thresholds` table.
4. NAAQS exceedances that are deleted from the database.

### **Non-Criteria Pollutants**

1. Any monitor/quarter whose first maximum is 175% greater than the 3-year historical maximum
2. The first maximum of the dataset is 150% greater than second maximum on a per monitor-year basis.

### **Certified Data**

1. Any monitor whose certified data has changed due to a change in the raw data for a monitor/year. This change may be in the form of an insertion, modification, or deletion of the supporting raw data.

## 7.0 Accuracy and Precision Transactions (RA, RP)

The transactions in this group are used to insert, update, and delete the individual observations of parameter values in the AQS database, for audit information. The parameter values are the known and observed concentrations of air pollutants measured with the various methods and at various time intervals. These observations of parameter values are collectively called raw audit data because they are the actual, unprocessed values reported by the monitoring sites. This is contrasted with the summaries of the observations derived by AQS software. For Precision and Accuracy Data, there are two sets of fields for each possible observation: actual value, which is the known concentration of a parameter, and indicated value, which is the observed concentration of a parameter as measured by the monitor.

Insert actions are used to enter audit data values where none previously existed. The monitor reporting the audit data values must already exist in the database. Delete actions are used to remove one or more existing audit data values from the AQS database. Update actions are used to change existing audit data values.

The audit data transactions have several fields in common: transaction type, action code, state code, country code, site ID, parameter, POC, and unit.

Transaction type RA contains accuracy data in the following fields:

Transaction Type	Level 2 Actual Value
Action Code	Level 2 Indicated Value
State Code	Level 3 Actual Value
County Code	Level 3 Indicated Value
Site ID	Level 4 Actual Value
Parameter	Level 4 Indicated Value
POC	Other Level Actual Value
Accuracy Audit ID	Other Level Indicated
Number	Value
Sample Duration	Zero Span
Unit	
Method	
Year Represented	
Quarter Represented	
Date	
Type Audit	
Local Primary Standard	
Audit Class	
Accuracy Type	
Audit Sample ID	
Expiration Date	
Audit Scheduled	
Level 1 Actual Value	
Level 1 Indicated Value	

---

Transaction type RP contains precision data in the following fields:

Transaction Type	POC	Actual Value
Action Code	Precision ID	Indicated Method
State Code	Sample Duration	Indicated Value
County Code	Unit	Collocated POC ID
Site ID	Actual Method	Precision Sample ID
Parameter	Date	Agency Performing Audit

---

## 7.1 Accuracy Data - Transaction Type RA

The type RA transaction is used for parameter observations at various intervals to insert, update, or delete accuracy raw data values.

For intermittent monitors, the actual value is the known value from the audit device. The indicated value is the observation recorded by the sampler.

For continuous monitors, the actual value is the known concentration of the gas mixture used to challenge the monitor. The indicated value is the observed concentration of gas indicated when the monitor was challenged with a known concentration of gas mixture. For continuous PM monitors, the actual value is the known value for the audit device, and the indicated value is the value observed by the sampler.

An insert transaction is used to insert observations into the database. An update transaction is used to change existing observations. A delete transaction is used to remove existing observations.

### 7.1.1 Transaction Type

**Description:** Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

**Attributes:** Alphanumeric  
2-character code  
Mandatory

**Coding Instructions:** Place RA in the first delimited field.

#### Business Rules:

##### Common Rules

1. Transaction Type is mandatory

##### **Error Messages:**

1. Transaction Type is Required.
2. Transaction Type must be in TRANSACTION\_TYPES table in database.

##### **Error Messages:**

1. Invalid Transaction Type.

##### Insert Rules

None.

##### Update Rules

None.

Delete Rules

None.

### 7.1.2 Action Code

**Description:** Indicates the data manipulation action to be performed by the transaction.

**Attributes:** Alphanumeric  
1-character code  
Mandatory

**Coding Instructions:** Place the values I, U, or D in the second delimited field.  
I - Insert a new row into the appropriate table in the database.  
U - Change one or more column values for an existing row in one or more tables.  
D - Delete a row from a table(s) for the row containing the key data.

#### Business Rules

Common Rules

1. Action Code is required.  
**Error Messages:**
  1. Action Code is Required.
2. Action Code must be either 'I', 'U', or 'D'..  
**Error Messages:**
  1. Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 7.1.3 State Code

**Description:** A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

**Attributes:** Alphanumeric  
2-character code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid FIPS state code in delimited field 3. A code is valid if it exists in the States Table.

**Business Rules**Common Rules:

1. State Code is mandatory.

**Error Messages:**

1. State Code is required.
2. A Site with (State Code, County Code, Site ID) must be in the SITES table

**Error Messages:**

1. Invalid Site..
2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

**7.1.4 County Code**

**Description:** A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

**Attributes:** Alphanumeric  
3-digit code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid county code in the fourth delimited field. A code is valid if it exists in combination with state code and city code, in the County Cities Table.

**Business Rules**Common Rules:

1. County Code is required.

**Error Messages:**

1. County Code is required.



- 
2. A Site with (State Code, County Code, Site ID) must be in the SITES table

**Error Messages:**

1. Invalid Site..
2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

### 7.1.5 Site ID

**Description:** A numeric identifier (ID) that uniquely identifies each air monitoring site within a county.

**Attributes:**           Alphanumeric  
                              4-digit ID  
                              Mandatory  
                              Key Field

**Coding Instructions:** Place a four-digit numeric code in the fifth delimited field. For update and delete, a site ID value is valid if it exists in combination with state code and county code in the Sites Table.

**Business Rules**Common Rules:

1. Site ID is mandatory.

**Error Messages:**

1. Site ID is required.

2. Site ID must be exactly 4 digits.

**Error Messages:**

1. Invalid Site ID length

3. (State Code, County Code, Site ID) must be in the SITES table.

**Error Messages:**

1. Invalid Site..
2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

### 7.1.6 Parameter

**Description:** The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

**Attributes:** Alphanumeric  
5-digit code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid parameter code in the sixth delimited field. A parameter value is valid if it exists in combination with state code, county code, site ID, and POC in the Monitors Table.

### Business Rules

Common Rules

1. Parameter Code is Mandatory.

**Error Messages:**

1. Parameter Code is required.
2. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database..

**Error Messages:**

1. Monitor ID (State, County, Site, Parameter, POC) not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 7.1.7 POC (Parameter Occurrence Code)

**Description:** An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter.

**Attributes:** Numeric  
2-digit ID  
Mandatory  
Key Field

**Coding Instructions:** Place a valid POC value in the seventh delimited field. A POC value is valid if it is between 1 and 99.

## Business Rules

### Common Rules

1. POC is Mandatory.

**Error Messages:**

1. POC is required.
2. POC must be a number between 1 and 99..  
**Error Messages:**
  1. Check constraint (AIRSRAQS.AVCON\_632937\_POC\_000) violated.
3. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database..  
**Error Messages:**
  1. Monitor ID (State, County, Site, Parameter, POC) not in database.

### Insert Rules

None.

### Update Rules

None.

### Delete Rules

None.

## 7.1.8 Accuracy Audit ID Number

**Description:** A sequentially assigned number used to identify (ID) a unique measurement data group for a monitor on a specific date.

**Attributes:** Numeric  
1-digit code (n)  
Mandatory when using the new transaction format (pipe-delimited)  
Optional when using the old transaction format (80 columns) and reporting only one audit transaction for the day. If more than one audit is performed on the same day, then this field must be valued for each accuracy transaction for that day, with different values to keep the transactions unique.  
Key Field

**Coding Instructions:** Place a valid accuracy audit ID number in the eighth delimited field.  
Valid values are 1 through 5.  
For the old transaction format (80 columns): This ID is mandatory in the database, but not mandatory on the old format transactions. If left blank, the system will generate a ID of 1 for the transaction on the

load step. However, if you are submitting multiple accuracy transactions for the same monitor and day, be sure to supply unique accuracy audit ID numbers for each transaction. This applies to the old transaction format only.

For the new transaction format (pipe-delimited), the accuracy audit ID number must always be supplied.

## **Business Rules**

### Common Rules

1. Accuracy Audit ID Number is required..

#### **Error Messages:**

1. Accuracy Audit ID Number is required.

2. Accuracy Audit ID must be between 1 and 5..

#### **Error Messages:**

1. Check constraint (AIRSRAQS.AVCON\_708024\_ACC\_A\_000) violated.

### Insert Rules

1. Accuracy Audit ID Number must not already be in the database for the Monitor, Date, Audit Class, and Accuracy Type.

#### **Error Messages:**

1. Unique constraint (AIRSRAQS.ACA\_ACCDET\_FK) violated.

### Update Rules

None.

### Delete Rules

None.

## **7.1.9 Sample Duration**

**Description:** The period of time during which the raw sample value was collected.

**Attributes:** Alphanumeric  
1-character code  
Mandatory

**Coding Instructions:** Place a valid sample duration code in the ninth delimited field. A sample duration value is valid if it exists in the Sample Durations Table and if it exists in combination with unit, parameter, method, and collection frequency in the Protocols Table.

## **Business Rules**

### Common Rules

1. The combination of (Parameter, Sample Duration, Unit, and Method) must be in PROTOCOLS table.

#### **Error Messages:**

1. Invalid Protocol.
2. Sample duration must be an observed rather than a computed duration..  
**Error Messages:**
  1. Raw data must be submitted with an observed duration.
3. Sample Duration must not be different than the one used for any other precision or accuracy data for the monitor in the year.  
**Error Messages:**
  1. Duration Code does not match the annual summary duration.

**Insert Rules**

1. Sample Duration is required..  
**Error Messages:**
  1. Sample Duration is required..

**Update Rules**

None.

**Delete Rules**

None.

**7.1.10 Unit**

**Description:** The dimensional system in which the pollutant concentration or parameter reading is expressed.

**Attributes:** Alphanumeric  
3-digit code  
Mandatory

**Coding Instructions:** Place a valid unit code in the tenth delimited field. A unit value is valid if it exists in the Units Table, and if it exists in combination with parameter, sampling duration, method, and collection frequency in the Protocols Table.

**Business Rules****Common Rules**

1. The combination of (Parameter, Sample Duration, Unit, and Method) must be in PROTOCOLS table.  
**Error Messages:**
  1. Invalid Protocol.
2. The unit type must be flow if the Audit Class is FLOW..  
**Error Messages:**
  1. Flow audits must be submitted with flow units.

- 
3. The unit type cannot be flow if the Audit Class is not FLOW..

**Error Messages:**

1. Flow units may only be used for flow audits

**Insert Rules**

1. Unit is required

**Error Messages:**

1. Unit is required.

**Update Rules**

None.

**Delete Rules**

None.

### 7.1.11 Method

**Description:** Identifies a particular method for collecting and analyzing samples of the monitor's parameter.

**Attributes:** Alphanumeric  
3-digit code  
Mandatory

**Coding Instructions:** Place a valid method code in the eleventh delimited field. A method code value is valid if it exists in combination with parameter in the Sampling Methodologies Table, and if it exists in combination with the parameter, sampling duration, and unit in the Protocols Table.

**Business Rules****Common Rules**

1. The combination of (Parameter, Sample Duration, Unit, and Method) must be in PROTOCOLS table.

**Error Messages:**

1. Invalid Protocol.

**Insert Rules**

1. Method is required.

**Error Messages:**

1. Method is required..

**Update Rules**

None.

**Delete Rules**

None.

### 7.1.12 Year Represented

**Description:** The year represented by the audit.

**Attributes:** Date  
4-digit year (yyyy)  
Optional

**Coding Instructions:** Place a valid year represented number in the twelfth delimited field. A year represented value is valid if it is in the format of YYYY and is less than or equal to accuracy date's year. The year represented is required only for lead analytical audits performed in the laboratory, to link the year to the concentration samples analyzed during the audits.

#### Business Rules

##### Common Rules

1. Year Represented must be the year of Date or the previous year.

**Error Messages:**

1. The Year Represented must be equal to or one year prior to the year of the Accuracy Date.

##### Insert Rules

1. Year Represented must be valued when Quarter Represented is valued..

**Error Messages:**

1. The Year Represented is required when the Qtr Represented is given.

##### Update Rules

None.

##### Delete Rules

None.

### 7.1.13 Quarter Represented

**Description:** The quarter represented by the audit.

**Attributes:** Alphanumeric  
2 characters  
Optional

**Coding Instructions:** Place a valid quarter represented number in the thirteenth delimited field. A quarter represented value is valid if it is Q1, Q2, Q3, or Q4, and is less than or equal to the quarter of the analysis, or any quarter of the previous year. The quarter represented is required only for lead (Pb) analytical audits performed in the laboratory, to link the quarter to the concentration samples analyzed during the audits.

**Business Rules****Common Rules**

1. Quarter Represented must be between 1 and 4.  
**Error Messages:**
  1. Check constraint (AIRSRAQS.AVCON\_633309\_QTR\_R\_000) violated
2. Quarter Represented must be for the quarter of Date or any of the previous four quarters.  
**Error Messages:**
  1. Qtr Represented must be qtr of Acc Date or any qtr of prior year.

**Insert Rules**

1. Quarter Represented must be valued when Year Represented is valued.  
**Error Messages:**
  1. Quarter Represented must be valued when Year Represented is valued

**Update Rules**

None.

**Delete Rules**

None.

**7.1.14 Date**

**Description:** The calendar date for which the accuracy audit is being reported.

**Attributes:** Date  
8-digit date  
Mandatory  
Key Field

**Coding Instructions:** Place a valid date in the fourteenth delimited field. A date value is valid if:

- It is in the form of YYYYMMDD,
- It is between January 1, 1980 and the current date,
- It falls within a valid sample period defined for the monitor, and,
- If a criteria pollutant monitor is being audited, it falls within a valid reporting organization period.

**Business Rules****Common Rules**

1. Date is required.  
**Error Messages:**
  1. Date is required.
2. Date must between 1/1/1980 and current date.  
**Error Messages:**
  1. The Accuracy Date must be between Jan 1, 1980 and the current date



3. Date must fall within a valid sample period for the monitor.  
**Error Messages:**
  1. This monitor was not being sampled during the defined Accuracy Date.
4. Date must fall within a valid monitor type assignment period for the monitor .  
**Error Messages:**
  1. Attempt to add data for which there is no corresponding Monitor Type Date Range
5. Date must fall within a valid reporting organization period for the monitor .  
**Error Messages:**
  1. No active reporting organization for criteria pollutant data.

#### Insert Rules

1. Accuracy Audit ID Number must not already be in the database for the Monitor, Date, Audit Class, and Accuracy Type.  
**Error Messages:**
  1. Unique constraint (AIRSRAQS.ACA\_ACCDET\_FK) violated.

#### Update Rules

1. Accuracy Audit ID Number must be in the database for the Monitor, Date, Audit Class, and Accuracy Type.  
**Error Messages:**
  1. No Accuracy Data to update or delete.

#### Delete Rules

1. Accuracy Audit ID Number must be in the database for the Monitor, Date, Audit Class, and Accuracy Type.  
**Error Messages:**
  1. Unique constraint (AIRSRAQS.ACA\_ACCDET\_FK) violated.

### **7.1.15 Type Audit**

**Description:** Description of who performed the audit and how the audit standard was certified.

**Attributes:** Alphanumeric  
20 characters  
Mandatory  
Key Field

**Coding Instructions:** Place a valid type audit term in the fifteenth delimited field. A type audit value is valid if it exists in the Audit Types Table.

#### **Business Rules**

#### Common Rules

1. Type Audit must be in AUDIT\_TYPES table.

**Error Messages:**

1. Integrity constraint (AIRSRAQS.AC\_AUTY\_FK) violated

2. AUDIT\_TYPES (AUDIT\_TYPE) must be at production status.

**Error Messages:**

1. Status for AUDIT\_TYPE is inactive

Insert Rules

1. Type Audit is required.

**Error Messages:**

1. Type Audit is required.

Update Rules

None.

Delete Rules

None.

### 7.1.16 Local Primary Standard

**Description:** The source of the local primary standards used for the audit.

**Attributes:**           Alphanumeric  
                              30 characters  
                              Mandatory

**Coding Instructions:** Place a valid local primary standard term in the sixteenth delimited field.  
A local primary standard term is valid if it exists in the Local Primary Standards Table.

**Business Rules**Common Rules

1. Local Primary Standard must be in LOCAL\_PRIMARY\_STANDARDS table.

**Error Messages:**

1. Integrity constraint (AIRSRAQS.AC\_LPS\_FK) violated.

2. Local Primary Standard must be at production status.

**Error Messages:**

1. Status for LOCAL\_PRI\_STD is inactive

Insert Rules

1. Local Primary Standard is required.

**Error Messages:**

1. Local Primary Standard is required.

Update Rules

None.

Delete Rules

None.

**7.1.17 Audit Class****Description:** Description of the class of audit taken at the monitor.**Attributes:** Alphanumeric  
20 characters  
Mandatory  
Key Field**Coding Instructions:** Place a valid audit class term in the seventeenth delimited field. An audit class term is valid if it exists in the Audit Classes Table, and, if there is an entry in the protocol Audit Classes Table for the parameter, sample duration, and unit combination, it matches the prescribed audit class term for that combination.

Values are Analytical, Flow, and Span.

Please note that, for the parameter-interval-units combination indicated in the following table, an audit class of Analytical is always required.

Parameter	Interval	Units	Audit Class
12128	7, 8, C	077	Analytical

**Business Rules**Common Rules

1. Audit Class is required.

**Error Messages:**

1. Audit Class is required
2. Audit Class must be in AUDIT\_CLASSES table.  
**Error Messages:**
  1. Integrity constraint (AIRSRAQS.AC\_AUC\_FK) violated.
3. Audit Class must be at production status.  
**Error Messages:**
  1. Status for AUDIT\_CLASS is inactive

4. The combination of Audit Class, Parameter, Sample Duration, and Unit, must be defined in the PROTOCOL\_AUDIT\_CLASSES table.

**Error Messages:**

1. Invalid audit class for protocol

Insert Rules

1. Accuracy Audit ID Number must not already be in the database for the Monitor, Date, Audit Class, and Accuracy Type.

**Error Messages:**

1. Unique constraint (AIRSRAQS.ACA\_ACCDET\_FK) violated.

Update Rules

None.

Delete Rules

None.

### 7.1.18 Accuracy Type

**Description:** A description of the type of accuracy test performed.

**Attributes:**           Alphanumeric  
                          20 characters  
                          Mandatory

**Coding Instructions:** Place a valid accuracy type term in the eighteenth delimited field. An accuracy type term is valid if it exists in the Accuracy Types Table.

**Business Rules**Common Rules

1. Accuracy Type is required.

**Error Messages:**

1. Accuracy Type is required.

2. Accuracy Type must be in ACCURACY\_TYPES table.

**Error Messages:**

1. Integrity constraint (AIRSRAQS.AC\_ACT\_FK) violated.

3. Accuracy Type must be at production status.

**Error Messages:**

1. Status for ACC\_TYPE is inactive.

Insert Rules

1. Accuracy Audit ID Number must not already be in the database for the Monitor, Date, Audit Class, and Accuracy Type.

**Error Messages:**

1. Unique constraint (AIRSRAQS.ACA\_ACCDET\_FK) violated.

Update Rules

None.

Delete Rules

None.

### 7.1.19 Audit Sample ID

**Description:** The unique identity (ID) number of the reference sample used to challenge the instrument.

**Attributes:** Alphanumeric  
10 characters  
Optional

**Coding Instructions:** Place the audit sample ID alphanumeric text in the nineteenth delimited field. No edit checks are performed on an audit sample ID value.

**Business Rules**

There are no business rules for Audit Sample ID.

### 7.1.20 Expiration Date

**Description:** The expiration date for the local primary standard.

**Attributes:** Date  
8-digit date  
Optional

**Coding Instructions:** Place a valid expiration date in the twentieth delimited field. An expiration date value is valid if it is in the format of YYYYMMDD.

**Business Rules**

Common Rules

1. The expiration date must be in the format 'YYYYMMDD'.

**Error Messages:**

1. Invalid Date Formst.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 7.1.21 Audit Scheduled

**Description:** The initial date that the performance audit was scheduled.

**Attributes:** Alphanumeric  
8 characters  
Optional

**Coding Instructions:** Place a valid audit scheduled date in the twenty-first delimited field. An audit scheduled value is valid if it is in the format of YYYYMMDD.

#### Business Rules

##### Common Rules

1. The expiration date must be in the format 'YYYYMMDD'.

##### **Error Messages:**

1. Invalid date format.

##### Insert Rules

None.

##### Update Rules

None.

##### Delete Rules

None.

### 7.1.22 Level 1-5 Actual Value

**Description:** The true observation of the parameter value at the prescribed audit level.

**Attributes:** Numeric  
10 digits, including 5 decimal places (nnnnn.nnnnn)  
Optional

**Coding Instructions:** The accuracy data transaction format allows for the specification of actual values for four levels. The levels are position-dependent and coordinate with the audit levels defined for the parameter and the method's recording mode (continuous or intermittent) in the Audit Levels Table. Each actual value must be submitted with a corresponding indicated value for the same level. The level 1 actual value is assigned to the twenty-second delimited field; level 2, to the twenty-fourth; level 3 to the twenty-sixth; level 4, to the twenty-eighth. Place the true values of parameter concentrations being used to challenge the monitor according to the defined levels in the appropriate field. An actual value is valid if it falls within the corresponding range of values defined for the parameter and recording mode in the Audit Levels Table. If no range is defined for the level, then the value is considered to be valid, but is not included in data completeness determinations.

For some parameters, a range of expected values has been established for observations. Concentrations reported outside the range may be data for another audit level. The relevant ranges and parameters are listed below. Ranges are specified in 40 Code of Federal Regulations (CFR) Part 58 Appendix A. The ranges included in AQS, however, have been expanded to allow data entry.

Parameter Code	Parameter Description	Level Number	Range
12128	Lead (TSP)	1	0.5 - 2.5 µg/m <sup>3</sup> (25 c)
12128	Lead (TSP)	2	2 - 5 µg/m <sup>3</sup> (25 c)
42101	Carbon Monoxide	1	2.7 - 10.5 ppm
42101	Carbon Monoxide	2	13.5 - 22 ppm
42101	Carbon Monoxide	3	21.1 - 49.5 ppm
42101	Carbon Monoxide	4	72 - 99 ppm
42401	Sulfur Dioxide	1	0.027 - 0.095 ppm
42401	Sulfur Dioxide	2	0.135 - 0.31 ppm
42401	Sulfur Dioxide	3	0.221 - 0.495 ppm
42401	Sulfur Dioxide	4	0.72 - 0.99 ppm
42602	Nitrogen Dioxide	1	0.027 - 0.088 ppm
42602	Nitrogen Dioxide	2	0.135 - 0.22 ppm
42602	Nitrogen Dioxide	3	0.221 - 0.51 ppm
42602	Nitrogen Dioxide	4	0.72 - 0.99 ppm
44201	Ozone	1	0.027 - 0.09 ppm
44201	Ozone	2	0.135 - 0.26 ppm
44201	Ozone	3	0.22 - 0.495 ppm
44201	Ozone	4	0.72 - 0.99 ppm

For some parameters, percent differences are utilized to reject data that could be in error as a result of transcription errors. The maximum percent differences and parameters are listed below:

Parameter Code	Maximum Percent Difference
44201	± 90 %
42602	± 90 %
42401	± 90 %

42101	± 90 %
12128	± 90 %

The percent difference is calculated using the following formula:

$$\left\{ \frac{(\text{indicated} - \text{actual})}{\text{actual}} \right\} \times 100$$

## Business Rules

### Common Rules

1. The Actual Value must be a number with no more than 5 digits either before or after the decimal point.

**Error Messages:**

1. Invalid number.
2. Actual Value must fall within the value range defined for the corresponding audit level.

**Error Messages:**

1. The value must be with the min and max concentration levels for the parameter.
3. The relative percent difference of Actual Value and Indicated Value may not exceed the maximum allowed for the parameter.

**Error Messages:**

1. Maximum Percent Difference defined for the parameter was exceeded.

### Insert Rules

None.

### Update Rules

None.

### Delete Rules

None.

## 7.1.23 Level 1-5 Indicated Value

**Description:** The recorded observation of the parameter value at the prescribed audit level.

**Attributes:** Numeric  
10 digits, including 5 decimal places (nnnnn.nnnnn)  
Optional



**Coding Instructions:** The accuracy data transaction format allows for the specification of indicated values for four levels. The levels are position-dependent and coordinate with the audit levels defined for the parameter and the method's recording mode (continuous or intermittent) in the Audit Levels Table. Each indicated value must be submitted with a corresponding actual value for the same level. The level 1 indicated value is assigned to the twenty-third delimited field; level 2, to the twenty-fifth; level 3 to the twenty-seventh; level 4, to the twenty-ninth. Place the recorded values of parameter concentrations that were used to challenge the monitor according to the defined levels in the appropriate field. An indicated value is valid if its percentage difference relative to the actual value does not exceed the level defined for the parameter on the Parameters Table.

For some parameters, a range of expected values has been established for observations. Concentrations reported outside the range may be data for another audit level. The relevant ranges and parameters are listed below. Ranges are specified in 40 CFR Part 58 Appendix A. The ranges included in AQS, however, have been expanded to allow data entry.

Parameter Code	Parameter Description	Level Number	Range
12128	Lead (TSP)	1	0.5 - 2.5 µg/cubicmeter (25 c)
12128	Lead (TSP)	2	2 - 5 µg/cubicmeter (25 c)
42101	Carbon Monoxide	1	2.7 - 10.5 ppm
42101	Carbon Monoxide	2	13.5 - 22 ppm
42101	Carbon Monoxide	3	21.1 - 49.5 ppm
42101	Carbon Monoxide	4	72 - 99 ppm
42401	Sulfur Dioxide	1	0.027 - 0.095 ppm
42401	Sulfur Dioxide	2	0.135 - 0.31 ppm
42401	Sulfur Dioxide	3	0.221 - 0.495 ppm
42401	Sulfur Dioxide	4	0.72 - 0.99 ppm
42602	Nitrogen Dioxide	1	0.027 - 0.088 ppm
42602	Nitrogen Dioxide	2	0.135 - 0.22 ppm
42602	Nitrogen Dioxide	3	0.221 - 0.51 ppm
42602	Nitrogen Dioxide	4	0.72 - 0.99 ppm
44201	Ozone	1	0.027 - 0.09 ppm
44201	Ozone	2	0.135 - 0.26 ppm
44201	Ozone	3	0.22 - 0.495 ppm

Parameter Code	Parameter Description	Level Number	Range
44201	Ozone	4	0.72 - 0.99 ppm

For some parameters, percent differences are utilized to reject data that could be in error as a result of transcription errors. The maximum percent differences and parameters are listed below:

Parameter Code	Maximum Percent Difference
44201	± 90 %
42602	± 90 %
42401	± 90 %
42101	± 90 %
12128	± 90 %

The percent difference is calculated using the following formula:

$$\left\{ \frac{(\text{indicated} - \text{actual})}{\text{actual}} \right\} \times 100$$

## Business Rules

### Common Rules

- The Indicated Value must be a number with no more than 5 digits either before or after the decimal point.  
**Error Messages:**
  - Invalid numeric format.
- Indicated Value must fall within the value range defined for the corresponding audit level.  
**Error Messages:**
  - The value must be with the min and max concentration levels for the parameter.
- The relative percent difference of Actual Value and Indicated Value may not exceed the maximum allowed for the parameter.  
**Error Messages:**
  - Maximum Percent Difference defined for the parameter was exceeded.

### Insert Rules

None.

### Update Rules

None.

Delete Rules

None.

### 7.1.24 Zero Span

**Description:** A measurement obtained with gas from a zero concentration. Zero span is the observed value read from the instrument when the concentration of the specific parameter used to test the monitor was zero.

**Attributes:** Numeric  
10 digits, including 5 decimals (nnnnn.nnnnn)  
Optional

**Coding Instructions:** Place the zero span value in the thirty-second delimited field.

#### **Business Rules**

Common Rules

1. The Zero Span must be a number with no more than 5 digits either before or after the decimal point.

**Error Messages:**

1. Invalid numeric format.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

---

## 7.2 Precision Data - Transaction Type RP

The type RP transaction is used for reporting quality control information. The values reported by intermittent collocated monitors are checked for agreement among the collocated monitors. Continuous monitors are challenged with a known concentration of gas. See Section 7.0 for a list of fields on the RP transaction.

An insert transaction is used to insert an observation into the database where it does not currently exist.

An update transaction is used to change or delete existing observations. The actual method and actual value fields on this transaction pertain to the designated monitor, and the indicated method and indicated value fields pertain to the collocated sampler (monitor). For continuous monitors, the indicated method and indicated value fields pertain to a known gas mixture.

If both the indicated and actual values from the intermittent collocated samplers are reported to the raw data files, then only the monitor ID (State-County-Site-Parameter-POC) and the collocated POC ID are required on the RP transaction, along with the date.

In other words, precision data from collocated monitors can be submitted in two different ways:

- 1) One way is to include the actual and indicated values on the precision transaction. In this case, there must be a daily raw data observation value in the database for the primary monitor, and this value must match the actual value on the precision transaction. If there is a raw data observation for the collocated POC ID, then the value supplied for indicated value must match that raw data observation value.
- 2) The second way to submit precision data is to refer to existing daily raw data values in the database. To submit data this way, the following fields are left null: sample duration, unit, actual method, actual value, indicated method, and indicated value. The transaction identifies the primary monitor using state, county, site, parameter, and POC; and identifies the duplicate sampler using collocated POC ID, along with the same state, county, site, and parameter values as the primary monitor. In this case, the database must contain daily raw data values for both samplers for the same day. The system will populate the precision data using those raw data values for that day.

See the data input transaction formats in the Appendices for a list of required fields on each transaction format.

### 7.2.1 Transaction Type

**Description:** Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

**Attributes:**           Alphanumeric  
                          2-character code  
                          Mandatory

**Coding Instructions:** Place RP in the first delimited field.

**Business Rules:**

Common Rules

1. Transaction Type is mandatory

**Error Messages:**

1. Transaction Type is Required.
  2. Transaction Type must be in TRANSACTION\_TYPES table in database.
- Error Messages:**
1. Invalid Transaction Type.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

## 7.2.2 Action Code

**Description:** Indicates the data manipulation action to be performed by the transaction.

**Attributes:**           Alphanumeric  
                          1-character code  
                          Mandatory

**Coding Instructions:** Place the values I, U, or D in the second delimited field.  
I - Insert a new row into the appropriate table in the database.  
U - Change one or more column values for an existing row in one or more tables.  
D - Delete a row from a table(s) for the row containing the key data.

**Business Rules**

Common Rules

1. Action Code is required.

**Error Messages:**

1. Action Code is Required.

- 
2. Action Code must be either 'I', 'U', or 'D'..

**Error Messages:**

1. Invalid Action Code.

**Insert Rules**

None.

**Update Rules**

None.

**Delete Rules**

None.

### 7.2.3 State Code

**Description:** A FIPS code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

**Attributes:**           Alphanumeric  
                              2-character code  
                              Mandatory  
                              Key Field

**Coding Instructions:** Place a valid FIPS state code in delimited field 3. A code is valid if it exists in the States Table.

**Business Rules****Common Rules:**

1. State Code is mandatory.

**Error Messages:**

1. State Code is required.
2. A Site with (State Code, County Code, Site ID) must be in the SITES table
- Error Messages:**
1. Invalid Site..
2. No data found.

**Insert Rules:**

None.

**Update Rules:**

None.

**Delete Rules:**

None.

### 7.2.4 County Code

**Description:** A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

**Attributes:** Alphanumeric  
3-digit code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid county code in the fourth delimited field. A code is valid if it exists in combination with state code and city code, in the County Cities Table.

#### Business Rules

##### Common Rules:

1. County Code is required.

##### **Error Messages:**

1. County Code is required.
2. A Site with (State Code, County Code, Site ID) must be in the SITES table

##### **Error Messages:**

1. Invalid Site..
2. No data found.

##### Insert Rules:

None.

##### Update Rules:

None.

##### Delete Rules:

None.

### 7.2.5 Site ID

**Description:** A numeric identifier (ID) that uniquely identifies each air monitoring site within a county.

**Attributes:** Alphanumeric  
4-digit ID  
Mandatory  
Key Field

**Coding Instructions:** Place a four-digit numeric code in the fifth delimited field. For update

and delete, a site ID value is valid if it exists in combination with state code and county code in the Sites Table.

## Business Rules

### Common Rules:

1. Site ID is mandatory.  
**Error Messages:**
  1. Site ID is required.
2. Site ID must be exactly 4 digits.  
**Error Messages:**
  1. Invalid Site ID length
3. (State Code, County Code, Site ID) must be in the SITES table.  
**Error Messages:**
  1. Invalid Site..
  2. No data found.

### Insert Rules:

None.

### Update Rules:

None.

### Delete Rules:

None.

## 7.2.6 Parameter

**Description:** The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

**Attributes:** Alphanumeric  
5-digit code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid parameter code in the sixth delimited field. A parameter value is valid if it exists in combination with state code, county code, site ID, and POC in the Monitors Table.

## Business Rules

### Common Rules

1. Parameter Code is Mandatory.  
**Error Messages:**
  1. Parameter Code is required.



2. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database..

**Error Messages:**

1. Monitor ID (State, County, Site, Parameter, POC) not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 7.2.7 POC (Parameter Occurrence Code)

**Description:** An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter.

**Attributes:** Numeric  
2-digit ID  
Mandatory  
Key Field

**Coding Instructions:** Place a valid POC value in the seventh delimited field. A POC value is valid if it is between 1 and 99.

**Business Rules**Common Rules

1. POC is Mandatory.

**Error Messages:**

1. POC is required.
2. POC must be a number between 1 and 99..  
**Error Messages:**
  1. Check constraint (AIRSRAQS.AVCON\_632937\_POC\_000) violated.
3. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database..  
**Error Messages:**
  1. Monitor ID (State, County, Site, Parameter, POC) not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 7.2.8 Precision ID

**Description:** A sequentially assigned number used to identify (ID) a particular precision check from others, when multiple checks are performed on the same day.

**Attributes:** Numeric  
2-digit ID (nn)  
Optional when using the old transaction format (80 columns)  
Mandatory when using the new transaction format (pipe-delimited)  
Key Field

**Coding Instructions:** Place a valid precision ID number in the eighth delimited field. A precision ID value is valid if it is greater than 0.

For the old transaction format (80 columns): This ID is mandatory in the database, but not mandatory on the transaction. If left blank on the transaction, the system will generate a "1" for the field as part of the load step. If precision data for the same monitor on the same date already exists (in the database or in the transaction set), the system will not increment the number being generated for the field. A "1" will still be system-generated for each blank precision ID field on the transactions.

Therefore, if an agency is attempting to submit multiple precision transactions for the same day and monitor, and is leaving this field blank, then all of the RP transactions in the job will get a system-generated "1" in this field. Then the transactions for the same day and monitor will reject because they are not unique (they will all have a precision ID of "1").

So be sure to manually supply unique values for this field if you are submitting more than one set of precision data values for the same day and monitor.

The above applies to the old transaction format only.

For the new transaction format (pipe-delimited), the precision ID must be supplied.

### Business Rules

Common Rules

1. Precision ID is required..

**Error Messages:**

1. Precision ID is required.
2. Precision ID must be between 1 and 99.

**Error Messages:**

1. Check constraint (AIRSRAQS.AVCON\_707788\_PREC\_\_000) violated.

#### Insert Rules

1. The combination of Date and Precision ID must not already be in the database for the Monitor..

**Error Messages:**

1. Unique constraint (AIRSRAQS.PD\_UK) violated

#### Update Rules

1. The combination of Date and Precision ID must be in the database for the Monitor.

**Error Messages:**

1. No Precision data to update or delete.

#### Delete Rules

1. The combination of Date and Precision ID must be in the database for the Monitor.

**Error Messages:**

1. No Precision data to update or delete.

### 7.2.9 Sample Duration

**Description:** The period of time during which the raw sample value was collected.

**Attributes:** Alphanumeric  
1-character code  
Mandatory

**Coding Instructions:** Place a valid sample duration code in the ninth delimited field. A sample duration value is valid if it exists in the Sample Durations Table and if it exists in combination with unit, parameter, method, and collection frequency in the Protocols Table.

#### **Business Rules**

##### Common Rules

1. The combination of (Sample Duration, Unit, Parameter, and Method) must be in PROTOCOLS table.

**Error Messages:**

1. Invalid Protocol.

2. Sample Duration must not be different than the one used for any other precision or accuracy data for the monitor (State Code, County Code, Site ID, Parameter, POC) in the year.

**Error Messages:**

1. Duration Code does not match the annual summary duration.

3. Continuous PM data must be submitted in Flow units or Duration X

**Error Messages:**

1. Continuous PM data must be reported in Flow units or Duration X.

4. Except for Continuous PM data, Sample Duration must be an observed, rather than computed, duration.

**Error Messages:**

1. Raw data must be submitted with an observed duration.

Insert Rules

1. Sample Duration is required..

**Error Messages:**

1. Sample Duration is required..

Update Rules

None.

Delete Rules

None.

## 7.2.10 Unit

**Description:** The dimensional system in which the pollutant concentration or parameter reading is expressed.

**Attributes:** Alphanumeric  
3-digit code  
Mandatory

**Coding Instructions:** Place a valid unit code in the tenth delimited field. A unit value is valid if it exists in the Units Table, and if it exists in combination with parameter, sampling duration, method, and collection frequency in the Protocols Table.

### Business Rules

Common Rules

1. The combination of (Sample Duration, Unit, Parameter, and Method) must be in PROTOCOLS table.

**Error Messages:**

1. Invalid Protocol.

2. Continuous PM data must be reported in Flow units or Duration X.

**Error Messages:**

1. Continuous PM data must be reported in Flow units or Duration X.

3. Flow units not allowed for Collocated\_Continuous Data

**Error Messages:**

1. Flow units not allowed for Collocated\_Continuous Data

- 
4. Flow units not allowed for Collocated\_Intermittent Data.

**Error Messages:**

1. Flow units not allowed for Collocated\_Intermittent Data.

**Insert Rules**

1. Unit is required

**Error Messages:**

1. Unit is required.

**Update Rules**

None.

**Delete Rules**

None.

### 7.2.11 Actual Method

**Description:** Identifies the particular method for collecting and analyzing the indicated precision check value. For a collocated data pair, this represents the method used to collect and analyze the sample value from the primary sampler.

**Attributes:** Alphanumeric  
3-digit code  
Mandatory

**Coding Instructions:** Place a valid method code in the eleventh delimited field.

For a precision check that is not a collocated data pair, an actual method value is valid if it exists in combination with parameter in the Sampling Methodologies Table, and if it exists in combination with sample duration, unit, and collection frequency in the Protocols Table.

For a collocated data pair, it is valid if it matches the method associated with the daily raw data point collected by the primary sampler on the precision date.

### Business Rules

**Common Rules**

1. The combination of (Sample Duration, Unit, Parameter, and Actual Method) must be in PROTOCOLS table.

**Error Messages:**

1. Invalid Protocol.

2. Actual Method must be of the same recording mode (i.e., continuous or intermittent) as all other methods used for the monitor in the year.

**Error Messages:**

1. Methods reported for a monitor-year must use the same recording modes.
3. For collocated data, the Actual Method must equal the method code of the corresponding raw data point..

**Error Messages:**

1. .

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

## 7.2.12 Date

**Description:** The calendar date for which the precision check is being reported.

**Attributes:** Date  
8-digit date  
Mandatory  
Key Field

**Coding Instructions:** Place a valid date in the twelfth delimited field. A date value is valid if:  
It is in the form of YYYYMMDD,  
It is between January 1, 1980 and the current date,  
It falls within a valid sample period defined for the monitor, and,  
If a criteria pollutant monitor is being audited, it falls within a valid reporting organization period.

**Business Rules**Common Rules

1. Date is Required.

**Error Messages:**

1. Date is Required.
2. Date must between 1/1/1980 and current date.
- Error Messages:**
1. The Accuracy Date must be between Jan 1, 1980 and the current date

- 
3. Date must fall within a valid sample period for the monitor.  
**Error Messages:**
    1. This monitor was not being sampled during the defined Accuracy Date.
  4. Date must fall within a valid monitor type assignment period for the monitor .  
**Error Messages:**
    1. Attempt to add data for which there is no corresponding Monitor Type Date Range
  5. Date must fall within a valid reporting organization period for the monitor .  
**Error Messages:**
    1. No active reporting organization for criteria pollutant data.

#### Insert Rules

1. The combination of Date and Precision ID must not already be in the database for the Monitor..  
**Error Messages:**
  1. Unique constraint (AIRSRAQS.PD\_UK) violated

#### Update Rules

1. The combination of Date and Precision ID must be in the database for the Monitor.  
**Error Messages:**
  1. No Precision data to update or delete.

#### Delete Rules

1. The combination of Date and Precision ID must be in the database for the Monitor.  
**Error Messages:**
  1. No Precision data to update or delete.

### **7.2.13 Actual Value**

**Description:** The true value of the parameter concentration with which the monitor was challenged. For a collocated data pair, the sample value from the primary sampler.

**Attributes:** Numeric  
10 digits, including 5 decimal places (nnnnn.nnnnn)  
Mandatory (Not required if value is stored as raw data. If reported, it must equal the value in the Raw Data Table)

**Coding Instructions:** Place the true value in the thirteenth delimited field.

For some parameters, upper limits have been established for precision observations, and the numeric value entered cannot exceed that maximum. The relevant maximum values and parameters are listed below:

Parameter Code	Parameter Description	Maximum Precision Value
11101	Suspended Particulate (TSP)	2000 µg/m <sup>3</sup> (25 c)
12128	Lead (TSP)	80 µg/m <sup>3</sup> (25 c)
42101	Carbon Monoxide	20 ppm
42401	Sulfur Dioxide	0.2 ppm
42602	Nitrogen Dioxide	0.2 ppm
44201	Ozone	0.2 ppm
81102	PM-10 Total 0 - 10 µm	2000 µg/m <sup>3</sup> (25 c)
88101	PM-2.5 Local Conditions	2000 µg/m <sup>3</sup> (LC)

For some parameters, percent differences are utilized to reject data that could be in error as a result of transcription errors. The maximum percent differences and parameters are listed below:

Parameter Code	Parameter Description	Maximum Percent Difference
11101	Suspended Particulate (TSP)	± 160 %
12128	Lead (TSP)	± 160 %
42101	Carbon Monoxide	± 90 %
42401	Sulfur Dioxide	± 90 %
42602	Nitrogen Dioxide	± 90 %
44201	Ozone	± 90 %
81102	PM-10 Total 0 - 10 µm	± 160 %
88101	PM-2.5 Local Conditions	± 160 %

For 11101, 12128, and 81102, the percent difference is calculated using the following formula:

$$\left\{ \frac{2(\text{indicated} - \text{actual})}{(\text{indicated} + \text{actual})} \right\} \times 100$$



For 42101, 42401, 42602, and 44201, the percent difference is calculated using the following formula:

$$\left\{ \frac{(indicated - actual)}{actual} \right\} \times 100$$

## Business Rules

### Common Rules

1. If supplied, the actual value must be a number with no more than 5 digits before or after the decimal point..  
**Error Messages:**
  1. Invalid Actual Value.
2. Actual Value must be less than the maximum defined for the parameter.  
**Error Messages:**
  1. The Test Conc exceeds the Max Precision Check Value for the parameter.
3. The relative percent difference of Actual Value and Indicated Value may not exceed the maximum allowed for the parameter.  
**Error Messages:**
  1. Maximum Percent Difference defined for the parameter was exceeded
4. If an Agency code is supplied on the Precision Data Transaction, then the Actual Value is required..  
**Error Messages:**
  1. Actual Value required for PEP Precision Data.
5. If the Sample Duration is X, the Actual Value is required..  
**Error Messages:**
  1. Actual\_Value required for Collocated\_Continuous Data.
6. If the Unit is type FLOW, the Actual Value is required..  
**Error Messages:**
  1. Actual\_Value required for Flow Audit Data.
7. If the Parameter type is "Gaseous" then the Actual Value is required..  
**Error Messages:**
  1. Actual\_Value required for Gaseous Data
8. If supplied for Collocated intermittent data, the Actual Value must match the value of the corresponding Raw Data point..  
**Error Messages:**
  1. Value on Precision Transaction does not match Raw Data value in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

**7.2.14 Indicated Method**

**Description:** Identifies the particular method for collecting and analyzing the sample value from the duplicate sampler. Only applies to collocated data.

**Attributes:** Alphanumeric  
3-digit code  
Optional

**Coding Instructions:** Place a valid method code in the fourteenth delimited field. An indicated method value is valid if it matches the method associated with the daily raw data point collected by the duplicate sampler on the precision date. (The duplicate sampler is identified by state code, county code, site ID, parameter, and collocated POC.)

**Business Rules**Common Rules

1. If supplied, the combination of (Sample Duration, Unit, Parameter, and Indicated Method) must be in PROTOCOLS table.  
**Error Messages:**
  1. Invalid Protocol.
2. Indicated Method must be of the same recording mode (i.e., continuous or intermittent) as all other methods used for the monitor in the year.  
**Error Messages:**
  1. Methods reported for a monitor-year must use the same recording modes.
3. If the Sample Duration is 'X', then the method's recording mode must be CONTINUOUS..  
**Error Messages:**
  1. Indicated method recording mode must be continuous for Duration X
4. If a Collocated POC is specified on the transaction, then the method's recording mode must be INTERMITTENT..  
**Error Messages:**
  1. Collocated data must have an Intermittent recording mode or Duration X.

5. If an Agency Code is supplied on the transaction, the Indicated Method must be blank..

**Error Messages:**

1. Indicated Method not allowed for PEP Precision Data.

6. If the Unit is of type FLOW, then Indicated method must be blank.

**Error Messages:**

1. Indicated\_Method not allowed for Flow Precision Data.

7. If the Paramter's type is Gaseous, then the Indicated method must be blank.

**Error Messages:**

1. Indicated\_Method not allowed for Gaseous Precision Data

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 7.2.15 Indicated Value

**Description:** The observed value of the parameter concentration with which the monitor was challenged. For a collocated data pair, the sample value from the duplicate sampler.

**Attributes:** Numeric  
10 digits, including 5 decimal places (nnnnn.nnnnn)  
Mandatory

**Coding Instructions:** Place the indicated value in the fifteenth delimited field. An indicated value is valid if its percentage difference relative to the test value does not exceed the level defined for the parameter on the Parameters Table.

For some parameters, upper limits have been established for precision observations, and the numeric value entered cannot exceed that maximum. The relevant maximum values and parameters are listed below:

Parameter Code	Parameter Description	Maximum Precision Value
11101	Suspended Particulate (TSP)	2000 µg/m <sup>3</sup> (25 c)
12128	Lead (TSP)	80 µg/m <sup>3</sup> (25 c)
42101	Carbon Monoxide	20 ppm
42401	Sulfur Dioxide	0.2 ppm

Parameter Code	Parameter Description	Maximum Precision Value
42602	Nitrogen Dioxide	0.2 ppm
44201	Ozone	0.2 ppm
81102	PM-10 Total 0 - 10 um	2000 µg/m <sup>3</sup> (25 c)
88101	PM-2.5 Local Conditions	2000 µg/m <sup>3</sup> (LC)

For some parameters, percent differences are utilized to reject data that could be in error as a result of transcription errors. The maximum percent differences and parameters are listed below:

Parameter Code	Parameter Description	Maximum Percent Difference
11101	Suspended Particulate (TSP)	± 160 %
12128	Lead (TSP)	± 160 %
42101	Carbon Monoxide	± 90 %
42401	Sulfur Dioxide	± 90 %
42602	Nitrogen Dioxide	± 90 %
44201	Ozone	± 90 %
81102	PM-10 Total 0 - 10 um	± 160 %
88101	PM-2.5 Local Conditions	± 160 %

For 11101, 12128, and 81102, the percent difference is calculated using the following formula:

$$\left\{ \frac{2(\text{indicated} - \text{actual})}{(\text{indicated} + \text{actual})} \right\} \times 100$$

For 42101, 42401, 42602, and 44201, the percent difference is calculated using the following formula:

$$\left\{ \frac{(\text{indicated} - \text{actual})}{\text{actual}} \right\} \times 100$$

## Business Rules

### Common Rules

- If supplied, the indicated value must be a number with no more than 5 digits before or after the decimal point..

#### Error Messages:

- Invalid Indicated Value.

2. Indicated Value must be less than the maximum defined for the parameter.  
**Error Messages:**
  1. The Test Conc exceeds the Max Precision Check Value for the parameter.
3. The relative percent difference of Actual Value and Indicated Value may not exceed the maximum allowed for the parameter.  
**Error Messages:**
  1. Maximum Percent Difference defined for the parameter was exceeded
4. If an Agency code is supplied on the Precision Data Transaction, then the Indicated Value is not allowed.  
**Error Messages:**
  1. Indicated Value not allowed for PEP Precision Data.
5. If the Sample Duration is X, the Actual Value is required..  
**Error Messages:**
  1. Indicated Value required for Collocated\_Continuous Data.
6. If the Unit is type FLOW, the Indicated Value is required..  
**Error Messages:**
  1. Indicated Value required for Flow Audit Data.
7. If the Parameter type is "Gaseous" then the Indicated Value is required..  
**Error Messages:**
  1. Indicated Value required for Gaseous Data
8. If supplied with a Collocated POC, , the Indicated Value must match the value of the corresponding Raw Data point..  
**Error Messages:**
  1. Value on Precision Transaction does not match Raw Data value in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

## 7.2.16 Collocated POC ID

**Description:** The POC of the duplicate sampler. Only applies to collocated data where the duplicate value is a recorded daily raw data point.

**Attributes:** Numeric  
2-digit ID  
Optional

**Coding Instructions:** Place a valid collocated POC ID in the sixteenth delimited field. A collocated POC is valid if it exists in combination with state code, county code, site ID, and parameter on the Monitors Table, and if there is a sample value recorded for that monitor in raw data on the precision date.

## Business Rules

### Common Rules

1. Collocated POC must be a number in the range of 1 to 99..

**Error Messages:**

1. Invalid Collocated POC.
2. The Combination of Parameter and Collocated POC must exist on the Monitors table for the Site..

**Error Messages:**

1. No Monitor present for Collocated POC.

### Insert Rules

None.

### Update Rules

None.

### Delete Rules

None.

## 7.2.17 Precision Sample ID

**Description:** The unique identity (ID) number of the reference sample used to challenge the instrument.

**Attributes:** Alphanumeric  
10 characters  
Optional

**Coding Instructions:** Place the precision check sample ID alphanumeric text in the seventeenth delimited field. No edit checks are performed on an precision sample ID value.

## Business Rules

There are no business rules for Precision Sample ID.

### 7.2.18 Agency Performing Audit

**Description:** The agency submitting precision data resulting from a Federal Reference Method (FRM) audit of the manual method for PM-2.5 monitoring. This agency is commonly an EPA laboratory or independent laboratory.

Do not use this field to identify the air pollution control agency that is responsible for the monitor, its data, and routine precision and accuracy data, because precision data submitted on this transaction (RP) with this field (agency performing audit) populated will not be included in the summary statistical data for the monitor.

**Attributes:** Alphanumeric  
4-digit code  
Optional

**Coding Instructions:** Place a valid agency performing audit code in the eighteenth delimited field. An agency performing audit value is valid if it exists in combination with state code in the State Agencies Table.

This transaction will be rejected if the precision audit is not an FRM audit. The actual value must be blank and must have been reported by the reporting agency as raw data.

#### Business Rules

##### Common Rules

1. The combination of State Code and Agency Performing Audit must be in the STATE\_AGENCIES table.

**Error Messages:**

1. Integrity constraint (AIRSRAQS.QAD\_SA\_FK) violated.
2. The State\_Agencies table row must be at production status..  
**Error Messages:**
  1. Status for STT\_STATE\_CODE, AG\_AGENCY\_CODE is inactive

##### Insert Rules

None.

##### Update Rules

None.

##### Delete Rules

None.

## 7.3 Critical Review Tests

For monitors defined as SLAMS, NAMS, and PAMS, measurement data is identified as suspect, or considered for review, if it meets certain "Critical Review" conditions. This data is periodically examined by EPA headquarters personnel.

The specific tests are as follows:

1. Precision data whose Relative Percent Difference (RPD) is greater than or equal to 50% for a single precision check.
2. Precision data whose quarterly RSD is greater than or equal to 50% on a per monitor basis as the summary record is generated from the update process.
3. Precision data whose quarterly RSD is greater than or equal to 40% on a reporting organization, per quarter basis as the summary record is generated from the update process.
4. Accuracy data whose percent difference between the Actual and Theoretical Values is greater than or equal to 50% on a per monitor, per occurrence basis.



## 8.0 Annual Summary Data - Transaction Type RS

Annual summary data is usually system-generated from the raw data contained in the system. However, the new AQS makes provision for storing summary data from agencies when they will not be submitting raw data.

Transaction type RS contains annual summary data in the following fields:

Transaction Type	Time of 2nd Highest Sample Value
Action Code	3rd Highest Sample Value
State Code	4th Highest Sample Value
County Code	5th Highest Sample Value
Site ID	Lowest Sample Value
Parameter	Arithmetic Mean
POC	Arithmetic Standard Deviation
Sample Duration	Geometric Mean
Unit	Geometric Standard Deviation
Method	10th Percentile
Year	25th Percentile
Exceptional Data Type	50th Percentile
Count of Observations	75th Percentile
Number of Exceptional Events	90th Percentile
Highest Sample Value	95th Percentile
Date of Highest Sample Value	98th Percentile
Time of Highest Sample Value	99th Percentile
2nd Highest Sample Value	Percent of Observations
Date of 2nd Highest Sample Value	Number < MDL

### 8.1 Transaction Type

**Description:** Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

**Attributes:** Alphanumeric  
2-character code  
Mandatory

**Coding Instructions:** Place the text RS in the first delimited field.

#### Business Rules:

##### Common Rules

1. Transaction Type is mandatory

#### Error Messages:

1. Transaction Type is Required.

2. Transaction Type must be in TRANSACTION\_TYPES table in database.

**Error Messages:**

1. Invalid Transaction Type.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

## 8.2 Action Code

**Description:** Indicates the data manipulation action to be performed by the transaction.

**Attributes:**           Alphanumeric  
                              1-character code  
                              Mandatory

**Coding Instructions:** Place the values I, U, or D in the second delimited field.  
I - Insert a new summary row into the Annual Summaries Table and associated rows in the Summary Maximums, Summary Percentiles, and Summary Protocols Tables.  
U - Change one or more columns within related annual summaries, summary maximums, summary percentiles, and summary protocols rows.  
D - Delete an annual summary row from the Annual Summaries Table and associated rows in the Summary Maximums, Summary Percentiles, and Summary Protocols Tables.

### Business Rules

Common Rules

1. Action Code is required.

**Error Messages:**

1. Action Code is Required.

2. Action Code must be either 'I', 'U', or 'D'..

**Error Messages:**

1. Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 8.3 State Code

**Description:** A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, D.C., or foreign countries.

**Attributes:** Alphanumeric  
2-character code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid FIPS state code in delimited field 3. A code is valid if it exists in the States Table.

#### Business Rules

Common Rules:

1. State Code is mandatory.

**Error Messages:**

1. State Code is required.
2. A Site with (State Code, County Code, Site ID) must be in the SITES table  
**Error Messages:**
  1. Invalid Site..
  2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

### 8.4 County Code

**Description:** A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

**Attributes:**           Alphanumeric  
                          3-character code  
                          Mandatory  
                          Key Field

**Coding Instructions:** Place a valid county code in the fourth delimited field. A code is valid if it exists in combination with state code and city code, in the County Cities Table.

### **Business Rules**

#### Common Rules:

1. County Code is required.

**Error Messages:**

1. County Code is required.
2. A Site with (State Code, County Code, Site ID) must be in the SITES table  
**Error Messages:**
  1. Invalid Site..
  2. No data found.

#### Insert Rules:

None.

#### Update Rules:

None.

#### Delete Rules:

None.

## **8.5 Site ID**

**Description:**           A numeric identifier (ID) that uniquely identifies each air monitoring site within a county.

**Attributes:**           Alphanumeric  
                          4-digit ID  
                          Mandatory  
                          Key Field

**Coding Instructions:** Place a four-digit site ID in the fifth delimited field. A site ID value is valid if it exists in combination with state code and county code in the Sites Table.

### **Business Rules**

#### Common Rules:

1. Site ID is mandatory.

**Error Messages:**

1. Site ID is required.
2. Site ID must be exactly 4 digits.  
**Error Messages:**
  1. Invalid Site ID length
3. (State Code, County Code, Site ID) must be in the SITES table.  
**Error Messages:**
  1. Invalid Site..
  2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

## 8.6 Parameter

**Description:** The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

**Attributes:** Alphanumeric  
5-digit code  
Mandatory  
Key Field

**Coding Instructions:** Place a valid parameter code in the sixth delimited field. A parameter value is valid if it exists in combination with state code, county code, site ID, and POC in the Monitors Table.

### Business Rules

Common Rules

1. Parameter Code is Mandatory.  
**Error Messages:**
  1. Parameter Code is required.
2. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database..  
**Error Messages:**
  1. Monitor ID (State, County, Site, Parameter, POC) not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

## 8.7 POC (Parameter Occurrence Code)

**Description:** An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter.

**Attributes:** Numeric  
2-digit ID  
Mandatory  
Key Field

**Coding Instructions:** Place a valid POC value in the seventh delimited field. A POC value is valid if it exists in combination with state code, county code, site ID, and parameter on the Monitors Table.

### Business Rules

Common Rules

1. POC is Mandatory.

**Error Messages:**

1. POC is required.
2. POC must be a number between 1 and 99..  
**Error Messages:**
  1. Check constraint (AIRSRAQS.AVCON\_632937\_POC\_000) violated.
3. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database..  
**Error Messages:**
  1. Monitor ID (State, County, Site, Parameter, POC) not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

## 8.8 Sample Duration

**Description:** The period of time during which all the raw data sample values being summarized were collected.

**Attributes:**           Alphanumeric  
                          1-character code  
                          Mandatory

**Coding Instructions:** Place a valid sample duration code in the eighth delimited field. A sample duration value is valid if it exists in the Sample Durations Table and if it exists in combination with unit, parameter, and method in the Protocols Table.

## **Business Rules**

### Common Rules

1. The combination of (Sample Duration, Unit, Parameter, and Sampling Methodology) must be in PROTOCOLS table.

**Error Messages:**

1. Invalid Protocol.
2. Sample duration must be an observed rather than a computed duration..  
**Error Messages:**
  1. Raw data must be submitted with an observed duration.
3. Only one observed Sample Duration per Monitor per Year is allowed.  
**Error Messages:**
  1. Another observed duration exists for this monitor year.

### Insert Rules

1. Sample Duration is required..

**Error Messages:**

1. Sample Duration is required..

### Update Rules

None.

### Delete Rules

None.

## **8.9 Unit**

**Description:**           The dimensional system in which the summary values are expressed.

**Attributes:**           Alphanumeric  
                          3-digit code  
                          Mandatory

**Coding Instructions:** Place a valid unit code in the ninth delimited field. A unit value is valid if it exists in the Units Table and if it exists in combination with sample duration, parameter, and method in the Protocols Table.

**Business Rules**Common Rules

1. The combination of (Sample Duration, Unit, Parameter, and Sampling Methodology) must be in PROTOCOLS table.

**Error Messages:**

1. Invalid Protocol.

Insert Rules

1. Unit is required

**Error Messages:**

1. Unit is required.

Update Rules

None.

Delete Rules

None.

**8.10 Method**

**Description:** Identifies the particular method for collecting and analyzing the raw data values that are the basis of the summary values.

**Attributes:** Alphanumeric  
3-digit code  
Mandatory

**Coding Instructions:** Place a valid method code in the tenth delimited field. A method value is valid if it exists in combination with parameter in the Sampling Methodologies Table, and if it exists in combination with sample duration, unit, and collection frequency in the Protocols Table.

**Business Rules**Common Rules

1. The combination of (Sample Duration, Unit, Parameter, and Sampling Methodology) must be in PROTOCOLS table.

**Error Messages:**

1. Invalid Protocol.

Insert Rules

1. Sampling Methodology is required.

**Error Messages:**

1. Method is required..

Update Rules

None.



Delete Rules

None.

## 8.11 Year

**Description:** The year whose raw data is summarized.

**Attributes:** Date  
4-digit year (yyyy)  
Mandatory  
Key Field

**Coding Instructions:** Place a valid year number in the eleventh delimited field. A year value is valid if it is in the format of YYYY and there is a valid sampling period defined for the monitor in that year.

### Business Rules

Common Rules

1. Year is required..

**Error Messages:**

1. Year is required..
2. Year must be in the format 'YYYY'..  
**Error Messages:**
  1. Invalid Year.
3. The monitor must have been active for some portion of the Year.  
**Error Messages:**
  1. Monitor not active during Annual Summary Year
4. Year must less than, or equal to, the current year.  
**Error Messages:**
  1. Annual Summary Year must be LE current year.

Insert Rules

1. The combination of Year and Exceptional Data Type must not already be in database for Monitor..  
**Error Messages:**
  1. Unique constraint (AIRSRAQS.ANS\_PK) violated

Update Rules

1. The combination of Year and Exceptional Data Type must be in database for Monitor.  
**Error Messages:**
  1. No Annual Summary data to update or delete.

Delete Rules

1. The combination of Year and Exceptional Data Type must be in database for Monitor.  
**Error Messages:**
  1. No Annual Summary data to update or delete

## 8.12 Exceptional Data Type

**Description:** Indication of whether exceptional data exists in the year being summarized, and whether such exceptional data is included in the reported summary values.

**Attributes:** Numeric  
1-digit code (n)  
Mandatory  
Key Field

**Coding Instructions:** Place a valid exceptional data type number in the twelfth delimited field. An exceptional data type value is valid if it exists in the Exceptional Data Types Table.

### Business Rules

Common Rules

1. Exceptional Data Type is required..  
**Error Messages:**
  1. Exceptional Data Type is required.
2. Exceptional Data Type must be in EXCEPTIONAL\_DATA\_TYPES table.  
**Error Messages:**
  1. Integrity constraint (AIRSRAQS.ANS\_EDT\_FK) violated
3. Exceptional Data Type must be at production status..  
**Error Messages:**
  1. Status for EDT\_ID is inactive.
4. Exceptional Data Type cannot be 0 if there are other summary records for the monitor and Year with Exceptional Data Type > 0..  
**Error Messages:**
  1. EDT cannot be 0 when exceptional event data already loaded for year.
5. Exceptional Data Type cannot be > 0 if there are other summary records for the monitor and Year with Exceptional Data Type of 0.  
**Error Messages:**
  1. EDT Indicator must be 0

Insert Rules

1. The combination of Year and Exceptional Data Type must not already be in database for Monitor.

**Error Messages:**

1. Unique constraint (AIRSRAQS.ANS\_PK) violated

Update Rules

1. The combination of Year and Exceptional Data Type must be in database for Monitor.

**Error Messages:**

1. No Annual Summary data to update or delete.

Delete Rules

1. The combination of Year and Exceptional Data Type must be in database for Monitor.

**Error Messages:**

1. No Annual Summary data to update or delete

### 8.13 Count of Observations

**Description:** The number of raw data values that are the basis for the summary values.

**Attributes:** Numeric  
5 digits (nnnnn)  
Optional

**Coding Instructions:** Place a valid count of observations in the thirteenth delimited field. A count of observations value is valid if it is greater than 0.

**Business Rules**Common Rules

1. Count of Observations must be a positive integer..

**Error Messages:**

1. Check constraint (AIRSRAQS.ANS\_POSITIVE\_OBS\_CNT) violated.

2. Count of Observations must not be greater than what is possible for Sample Duration.

**Error Messages:**

1. Observation Count is an invalid value.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

---

## 8.14 Number of Exceptional Events

**Description:** The number of data points in the summarized data set that were qualified by exceptional events.

**Attributes:** Numeric  
5 digits (nnnnn)  
Optional

**Coding Instructions:** Place a valid number of exceptional events value in the fourteenth delimited field. A number of exceptional events value is valid if:

- 1) it is 0 and the exceptional data type is 0 or 1; or
- 2) it is greater than 0 and less than or equal to count of observations, and exceptional data type is 2.

### Business Rules

#### Common Rules

1. Number of Exceptional Events must be less than, or equal to, Count of Observations..

**Error Messages:**

1. Check constraint (AIRSRAQS.ANS\_EX\_DATA\_CNT) violated.

#### Insert Rules

None.

#### Update Rules

None.

#### Delete Rules

None.

## 8.15 Highest Sample Value

**Description:** The highest sample value in the yearly sample value set.

**Attributes:** Numeric  
10 digits, including 5 decimal places (nnnnn.nnnnn)  
Optional

**Coding Instructions:** Place a valid highest sample value in the fifteenth delimited field. A highest sample value is valid if it is greater than or equal to the second, third, fourth, and fifth highest values reported on the transaction record.

**Business Rules**Common Rules

1. Highest Sample Value must be a number with no more than 5 digits either before or after the decimal point..

**Error Messages:**

1. Invalid Summary Maximum.
2. Highest Sample Value must be greater than or equal to the Second Highest Sample Value.  
**Error Messages:**
  1. Sample Value must be less than or equal to the sample value of the previous level.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

**8.16 Date of Highest Sample Value**

**Description:** The earliest date on which the highest sample value in the yearly data set was reported.

**Attributes:** Date  
8-digit date  
Optional

**Coding Instructions:** Place a valid date of highest sample value in the sixteenth delimited field. A date of highest sample value is valid if it is in the format of YYYYMMDD where the year portion is equal to year.

**Business Rules**Common Rules

1. Date of Highest Sample Value must be in the format 'YYYYMMDD'..

**Error Messages:**

1. Invalid Date.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

## 8.17 Time of Highest Sample Value

**Description:** The time of day at which the highest sample value in the yearly data set was reported.

**Attributes:** Alphanumeric  
5 characters  
Optional

**Coding Instructions:** Place a valid time of highest sample value in the seventeenth delimited field. A time of highest sample value is valid if it is in the form of HH:MM, where HH is between 00 and 23, and MM is between 00 and 59.

### Business Rules

#### Common Rules

1. Time of Highest Sample Value must be in the format 'HH:MM'..

**Error Messages:**

1. Invalid Time.

#### Insert Rules

None.

#### Update Rules

None.

#### Delete Rules

None.

## 8.18 Second Highest Sample Value

**Description:** The second highest sample value in the yearly sample value set.

**Attributes:** Numeric  
10 digits, including 5 decimal places (nnnnn.nnnnn)  
Optional

**Coding Instructions:** Place a sample second highest sample value in the eighteenth delimited field. A second highest sample value is valid if it is not greater than highest sample value, and is greater than or equal to the third, fourth, and fifth highest values reported on the transaction record.

### Business Rules

#### Common Rules

1. Must be a number with no more than 5 digits either before or after the decimal point...

**Error Messages:**

1. Invalid Summary 2nd Highest Value.

2. The 2nd Highest Sample Value must not be greater than the Highest Sample Value, nor less than the 3rd Highest Sample Value.

**Error Messages:**

1. Sample Value must be less than or equal to the sample value of the previous level

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

## 8.19 Date of Second Highest Sample Value

**Description:** If the second highest value is less than the highest, this identifies the earliest date on which the second highest sample value in the yearly data set was reported; if the second highest is equal to the highest, this identifies the second earliest date on which the value was reported.

**Attributes:** Date  
8-digit date  
Optional

**Coding Instructions:** Place a valid date of second highest sample value in the nineteenth delimited field. A date of second highest sample value is valid if it is in the format of YYYYMMDD where the year portion is equal to year. If the highest sample value and second highest sample value are equal, then date of second highest sample must be greater than date of highest sample value.

### Business Rules

Common Rules

1. Date of 2<sup>nd</sup> Highest Sample Value must be in the format 'YYYYMMDD'..

**Error Messages:**

1. Invalid Date.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

## 8.20 Time of Second Highest Sample Value

**Description:** The time of day on which the second highest sample value in the yearly data set was reported.

**Attributes:** Alphanumeric  
5 characters  
Optional

**Coding Instructions:** Place a valid time of highest sample value in the twentieth delimited field. A time of highest sample value is valid if it is in the form of HH:MM, where HH is between 00 and 23, and MM is between 00 and 59.

### Business Rules

#### Common Rules

1. Time of 2<sup>nd</sup> Highest Sample Value must be in the format 'HH:MM'..

**Error Messages:**

1. Invalid Time.

#### Insert Rules

None.

#### Update Rules

None.

#### Delete Rules

None.

## 8.21 Third Highest Sample Value

**Description:** The third highest sample value in the yearly sample value set.

**Attributes:** Numeric  
10 digits, including 5 decimal places (nnnnn.nnnnn)  
Optional

**Coding Instructions:** Place a third highest sample value in the twenty-first delimited field. A third highest sample value is valid if it is not greater than second highest sample value, and is greater than or equal to the fourth and fifth highest values reported on the transaction record.

### Business Rules

#### Common Rules

1. Must be a number with no more than 5 digits either before or after the decimal point...

**Error Messages:**

1. Invalid Summary 3rd Highest Value.



2. The 3rd Highest Sample Value must not be greater than the 2nd Highest Sample Value, nor less than the 4th Highest Sample Value.

**Error Messages:**

1. Sample Value must be less than or equal to the sample value of the previous level

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

## 8.22 Fourth Highest Sample Value

**Description:** The fourth highest sample value in the yearly sample value set.

**Attributes:** Numeric  
10 digits, including 5 decimal places (nnnnn.nnnnn)  
Optional

**Coding Instructions:** Place a fourth highest sample value in the twenty-second delimited field. A fourth highest sample value is valid if it is not greater than third highest sample value, and is greater than or equal to the fifth highest value reported on the transaction record.

**Business Rules**Common Rules

1. Must be a number with no more than 5 digits either before or after the decimal point...

**Error Messages:**

1. Invalid Summary 4<sup>th</sup> Highest Value.
2. The 4th Highest Sample Value must not be greater than the 3rd Highest Sample Value, nor less than the 5th Highest Sample Value.  
**Error Messages:**
  1. Sample Value must be less than or equal to the sample value of the previous level.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

---

## 8.23 Fifth Highest Sample Value

**Description:** The fifth highest sample value in the yearly sample value set.

**Attributes:** Numeric  
10 digits, including 5 decimal places (nnnnn.nnnnn)  
Optional

**Coding Instructions:** Place a fifth highest sample value in the twenty-third delimited field. A fifth highest sample value is valid if it is not greater than fourth highest sample value.

### Business Rules

#### Common Rules

1. Must be a number with no more than 5 digits either before or after the decimal point.

**Error Messages:**

1. Invalid Summary 5<sup>th</sup> Highest Value.
  2. The 5th Highest Sample Value must not be greater than the 4th Highest Sample Value.
- Error Messages:**
1. Sample Value must be less than or equal to the sample value of the previous level

#### Insert Rules

None.

#### Update Rules

None.

#### Delete Rules

None.

## 8.24 Lowest Sample Value

**Description:** The lowest sample value in the yearly sample value set.

**Attributes:** Numeric  
10 digits, including 5 decimal places (nnnnn.nnnnn)  
Optional

**Coding Instructions:** Place a lowest sample value in the twenty-fourth delimited field. A lowest sample value is valid if it is not greater than the lowest of the highest values reported on the transaction record.

### Business Rules

#### Common Rules

1. Must be a number with no more than 5 digits either before or after the decimal point.

**Error Messages:**

1. Invalid Lowest Sample Value.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

## 8.25 Arithmetic Mean

**Description:** The measure of central tendency obtained from the sum of the observed pollutant data values in the yearly data set divided by the number of values that comprise the sum for the yearly data set.

**Attributes:** Numeric  
10 digits, including 5 decimal places (nnnnn.nnnnn)  
Optional

**Coding Instructions:** Place the arithmetic mean in the twenty-fifth delimited field.

### Business Rules

Common Rules

1. Must be a number with no more than 5 digits either before or after the decimal point.

**Error Messages:**

1. Invalid Arithmetic Mean.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

## 8.26 Arithmetic Standard Deviation

**Description:** The measure of the dispersion about the central tendency of a pollutant that is the square root of the arithmetic mean of the squares of the variation of each data value from the arithmetic mean of the data values of the yearly data set.

**Attributes:** Numeric  
10 digits, including 5 decimal places (nnnnn.nnnnn)  
Optional

**Coding Instructions:** Place the arithmetic standard deviation in the twenty-sixth delimited field.

**Business Rules**Common Rules

1. Must be a number with no more than 5 digits either before or after the decimal point.

**Error Messages:**

1. Invalid Arithmetic Standard Deviation.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

**8.27 Geometric Mean**

**Description:** The measure of central tendency obtained from the sum of the logarithms of observed sample values in the yearly data set, divided by the number of values, with that result applied as an exponent to 10.

**Attributes:** Numeric  
10 digits, including 5 decimal places (nnnnn.nnnnn)  
Optional

**Coding Instructions:** Place the geometric mean in the twenty-seventh delimited field.

**Business Rules**Common Rules

1. Must be a number with no more than 5 digits either before or after the decimal point.

**Error Messages:**

1. Invalid geometric mean.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

---

## 8.28 Geometric Standard Deviation

**Description:** The measure of the dispersion about the central tendency of a pollutant that is based on the variation between the geometric mean of a sample of values and the logarithms of the values themselves.

**Attributes:** Numeric  
10 digits, including 5 decimal places (nnnnn.nnnnn)  
Optional

**Coding Instructions:** Place the geometric standard deviation in the twenty-eighth delimited field.

### Business Rules

#### Common Rules

1. Must be a number with no more than 5 digits either before or after the decimal point.

**Error Messages:**

1. Invalid Geometric Standard Deviation.

#### Insert Rules

None.

#### Update Rules

None.

#### Delete Rules

None.

## 8.29 10<sup>TH</sup> Percentile

**Description:** The sample value occurring in the tenth percentile of the yearly data set when sorted from lowest to highest.

**Attributes:** Numeric  
10 digits, including 5 decimal places (nnnnn.nnnnn)  
Optional

**Coding Instructions:** Place the sample value in the twenty-ninth delimited field.

### Business Rules

#### Common Rules

1. Must be a number with no more than 5 digits either before or after the decimal point..

**Error Messages:**

1. Invalid Summary Percentile
2. The 10th Percentile must not be greater than the 25th Percentile.

**Error Messages:**

1. Percentile Sample Value is not greater than prior percentile sample value.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 8.30 25<sup>TH</sup> Percentile

**Description:** The sample value occurring in the twenty-fifth percentile of the yearly data set when sorted from lowest to highest.

**Attributes:** Numeric  
10 digits, including 5 decimal places (nnnnn.nnnnn)  
Optional

**Coding Instructions:** Place the sample value in the thirtieth delimited field.

#### **Business Rules**

##### Common Rules

1. Must be a number with no more than 5 digits either before or after the decimal point..

**Error Messages:**

1. Invalid Summary Percentile
2. The 25th Percentile must not be greater than the 50th Percentile, nor less than the 10th Percentile.

**Error Messages:**

1. Percentile Sample Value is not greater than prior percentile sample value.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 8.31 50<sup>TH</sup> Percentile

**Description:** The sample value occurring in the fiftieth percentile of the yearly data set when sorted from lowest to highest.

**Attributes:** Numeric  
10 digits, including 5 decimal places (nnnnn.nnnnn)

Optional

**Coding Instructions:** Place the sample value in the thirty-first delimited field.

**Business Rules**

Common Rules

1. Must be a number with no more than 5 digits either before or after the decimal point..

**Error Messages:**

1. Invalid Summary Percentile
2. The 50th Percentile must not be greater than the 75th Percentile, nor less than the 25th Percentile.

**Error Messages:**

1. Percentile Sample Value is not greater than prior percentile sample value.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 8.32 75<sup>TH</sup> Percentile

**Description:** The sample value occurring in the seventy-fifth percentile of the yearly data set when sorted from lowest to highest.

**Attributes:** Numeric  
10 digits, including 5 decimal places (nnnnn.nnnnn)  
Optional

**Coding Instructions:** Place the sample value in the thirty-second delimited field.

**Business Rules**

Common Rules

1. Must be a number with no more than 5 digits either before or after the decimal point..

**Error Messages:**

1. Invalid Summary Percentile
2. The 75th Percentile must not be greater than the 90th Percentile, nor less than the 50th Percentile.

**Error Messages:**

1. Percentile Sample Value is not greater than prior percentile sample value.

Insert Rules

---

None.

Update Rules

None.

Delete Rules

None.

### 8.33 90<sup>TH</sup> Percentile

**Description:** The sample value occurring in the ninetieth percentile of the yearly data set when sorted from lowest to highest.

**Attributes:** Numeric  
10 digits, including 5 decimal places (nnnnn.nnnnn)  
Optional

**Coding Instructions:** Place the sample value in the thirty-third delimited field.

#### Business Rules

Common Rules

1. Must be a number with no more than 5 digits either before or after the decimal point..

**Error Messages:**

1. Invalid Summary Percentile
2. The 90th Percentile must not be greater than the 95th Percentile, nor less than the 75th Percentile.

**Error Messages:**

1. Percentile Sample Value is not greater than prior percentile sample value.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

### 8.34 95<sup>TH</sup> Percentile

**Description:** The sample value occurring in the ninety-fifth percentile of the yearly data set when sorted from lowest to highest.

**Attributes:** Numeric  
10 digits, including 5 decimal places (nnnnn.nnnnn)  
Optional



**Coding Instructions:** Place the sample value in the thirty-fourth delimited field.

**Business Rules**Common Rules

1. Must be a number with no more than 5 digits either before or after the decimal point..

**Error Messages:**

1. Invalid Summary Percentile
2. The 95th Percentile must not be greater than the 98th Percentile, nor less than the 90th Percentile.

**Error Messages:**

1. Percentile Sample Value is not greater than prior percentile sample value.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

**8.35 98<sup>TH</sup> Percentile**

**Description:** The sample value occurring in the ninety-eighth percentile of the yearly data set when sorted from lowest to highest.

**Attributes:** Numeric  
10 digits, including 5 decimal places (nnnnn.nnnnn)  
Optional

**Coding Instructions:** Place the sample value in the thirty-fifth delimited field.

**Business Rules**Common Rules

1. Must be a number with no more than 5 digits either before or after the decimal point..

**Error Messages:**

1. Invalid Summary Percentile
2. The 98th Percentile must not be greater than the 99th Percentile, nor less than the 95th Percentile.

**Error Messages:**

1. Percentile Sample Value is not greater than prior percentile sample value.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

**8.36 99<sup>TH</sup> Percentile**

**Description:** The sample value occurring in the ninety-ninth percentile of the yearly data set when sorted from lowest to highest.

**Attributes:** Numeric  
10 digits, including 5 decimal places (nnnnn.nnnnn)  
Optional

**Coding Instructions:** Place the sample value in the thirty-sixth delimited field.

**Business Rules**Common Rules

1. Must be a number with no more than 5 digits either before or after the decimal point..

**Error Messages:**

1. Invalid Summary Percentile
2. The 99th Percentile must not be less than the 98th Percentile.

**Error Messages:**

1. Percentile Sample Value is not greater than prior percentile sample value.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

**8.37 Percent of Observations**

**Description:** The percent of actual data values that were reported compared to the number of data values that could have been reported for the year.

**Attributes:** Numeric  
10 digits, including 4 decimal places (nnnnnn.nnnn)  
Optional

**Coding Instructions:** Place the observation percentage in the thirty-seventh delimited field.

**Business Rules**Common Rules

1. The percent of observations must be a number between 0 and 100.

**Error Messages:**

1. Invalid Percent of Observations.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

**8.38 Number less than Minimum Detectable Value**

**Description:** Represents the number of substitutions of one-half the Method Detectable Limit value for the year.

**Attributes:** Numeric  
5 digits (nnnnn)  
Optional

**Coding Instructions:** Place the count of observations with one-half the MDL in the thirty-eighth delimited field.

**Business Rules**Common Rules

1. Number < MDL must be an integer greater than or equal to 0.

**Error Messages:**

1. Invalid Number < MDL.
2. Number < MDL must be less than, or equal to, Count of Observations.  
**Error Messages:**
  1. Check constraint (AIRSRAQS.ANS\_OBS\_CNT\_LT\_HALF\_MDL) violated

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

## 9.0 Blanks Data – Transaction Type RB

Blanks data provides an audit of background concentrations of parameters in the un-exposed filters.

Transaction type RB contains blanks data in the following fields:

Transaction Type	Unit
Action Code	Method
State Code	Blank Type
County Code	Date
Site ID	Time
Parameter	Blank Value
POC	
Sample Duration	

Insert transactions are used to enter new blank measurement values.

Update transactions are used to change existing blank measurement values.

Delete Transactions are used to remove existing blank measurement values.

The details for each field on the blank transaction are provided below:

### 9.1 Transaction Type

**Description:** Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

**Attributes:** Alphanumeric  
2-character code  
Mandatory

**Coding Instructions:** Place RB in the first delimited field.

#### **Business Rules:**

##### Common Rules

1. Transaction Type is mandatory

##### **Error Messages:**

1. Transaction Type is Required.
  2. Transaction Type must be in TRANSACTION\_TYPES table in database.
- ##### **Error Messages:**
1. Invalid Transaction Type.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

## 9.2 Action Code

**Description:** Indicates the data manipulation action to be performed by the transaction.

**Attributes:**           Alphanumeric  
                          1-character code  
                          Mandatory

**Coding Instructions:** Place the values I, U, or D in the second delimited field.  
I - Insert a new row into the appropriate table in the database.  
U - Change one or more column values for an existing row in one or more tables.  
D - Delete a row from a table(s) for the row containing the key data.

### Business Rules

Common Rules

1. Action Code is required.

**Error Messages:**

1. Action Code is Required.

2. Action Code must be either 'I', 'U', or 'D'..

**Error Messages:**

1. Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

## 9.3 State Code

**Description:** A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

**Attributes:**           Alphanumeric  
                          2-character code  
                          Mandatory  
                          Key Field

**Coding Instructions:** Place a valid FIPS state code in delimited field 3. A code is valid if it exists in the States Table.

### Business Rules

#### Common Rules:

1. State Code is mandatory.

**Error Messages:**

1. State Code is required.
  2. A Site with (State Code, County Code, Site ID) must be in the SITES table
- Error Messages:**
1. Invalid Site..
  2. No data found.

#### Insert Rules:

None.

#### Update Rules:

None.

#### Delete Rules:

None.

## 9.4 County Code

**Description:** A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

**Attributes:**           Alphanumeric  
                          3-digit code  
                          Mandatory  
                          Key Field

**Coding Instructions:** Place a valid county code in the fourth delimited field. A code is valid if it exists in combination with state code and city code, in the County Cities Table.

**Business Rules**Common Rules:

1. County Code is required.  
**Error Messages:**
  1. County Code is required.
2. A Site with (State Code, County Code, Site ID) must be in the SITES table  
**Error Messages:**
  1. Invalid Site..
  2. No data found.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

**9.5 Site ID**

**Description:** A numeric identifier (ID) that uniquely identifies each air monitoring site within a county.

**Attributes:**           Alphanumeric  
                              4-digit ID  
                              Mandatory  
                              Key Field

**Coding Instructions:** Place a four-digit numeric code in the fifth delimited field. For update and delete, a site ID value is valid if it exists in combination with state code and county code in the Sites Table.

**Business Rules**Common Rules:

1. Site ID is mandatory.  
**Error Messages:**
  1. Site ID is required.
2. Site ID must be exactly 4 digits.  
**Error Messages:**
  1. Invalid Site ID length

- 
3. (State Code, County Code, Site ID) must be in the SITES table.

**Error Messages:**

1. Invalid Site..
2. No data found.

**Insert Rules:**

None.

**Update Rules:**

None.

**Delete Rules:**

None.

## 9.6 Parameter

**Description:**

The code assigned to the parameter measured by the monitor.  
Parameters may be pollutants or non-pollutants.

**Attributes:**

Alphanumeric  
5-digit code  
Mandatory  
Key Field

**Coding Instructions:**

Place a valid parameter code in the sixth delimited field. A parameter value is valid if it exists in combination with state code, county code, site ID, and POC in the Monitors Table.

**Business Rules****Common Rules**

1. Parameter Code is Mandatory.

**Error Messages:**

1. Parameter Code is required.
2. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database..  
**Error Messages:**
  1. Monitor ID (State, County, Site, Parameter, POC) not in database.

**Insert Rules**

None.

**Update Rules**

None.

**Delete Rules**

None.



---

## 9.7 POC (Parameter Occurrence Code)

**Description:** An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter.

**Attributes:** Numeric  
2-digit ID  
Mandatory  
Key Field

**Coding Instructions:** Place a valid POC value in the seventh delimited field. A POC value is valid if it is between 1 and 99.

### Business Rules

#### Common Rules

1. POC is Mandatory.

**Error Messages:**

1. POC is required.

2. POC must be a number between 1 and 99..

**Error Messages:**

1. Check constraint (AIRSRAQS.AVCON\_632937\_POC\_000) violated.

3. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database..

**Error Messages:**

1. Monitor ID (State, County, Site, Parameter, POC) not in database.

#### Insert Rules

None.

#### Update Rules

None.

#### Delete Rules

None.

## 9.8 Sample Duration

**Description:** The period of time during which the raw sample value was collected.

**Attributes:** Alphanumeric  
1-character code  
Mandatory

**Coding Instructions:** Place a valid sample duration code in the eighth delimited field. A sample duration value is valid if it exists in the Sample Durations Table and if it exists in combination with unit, parameter, method, and collection frequency in the Protocols Table.

## Business Rules

### Common Rules

1. The combination of (Sample Duration, Unit, Parameter, and Method) must be in PROTOCOLS table.  
**Error Messages:**
  1. Invalid Protocol.
2. Sample duration must be an observed rather than a computed duration..  
**Error Messages:**
  1. Raw data must be submitted with an observed duration.
3. Sample Duration must not be different than the one used for any other raw data for the monitor in the year.  
**Error Messages:**
  1. Duration Code does not match the annual summary duration.

### Insert Rules

1. Sample Duration is required..  
**Error Messages:**
  1. Sample Duration is required..

### Update Rules

None.

### Delete Rules

None.

## 9.9 Unit

**Description:** The dimensional system in which the pollutant concentration or parameter reading is expressed.

**Attributes:** Alphanumeric  
3-digit code  
Mandatory

**Coding Instructions:** Place a valid unit code in the ninth delimited field. A unit value is valid if it exists in the Units Table and if it exists in combination with parameter, sampling duration, method, and collection frequency in the Protocols Table.

**Business Rules**Common Rules

1. The combination of (Sample Duration, Unit, Parameter, Method, and Sampling Frequency) must be in PROTOCOLS table.

**Error Messages:**

1. Invalid Protocol.

Insert Rules

1. Unit is required

**Error Messages:**

1. Unit is required.

Update Rules

None.

Delete Rules

None.

**9.10 Method**

**Description:** Identifies a particular method for collecting and analyzing samples of the monitor's parameter.

**Attributes:** Alphanumeric  
3-digit code  
Mandatory

**Coding Instructions:** Place a valid method code in the tenth delimited field. A method code is valid if it exists in combination with parameter in the Sampling Methodologies Table, and if it exists in combination with parameter, sampling duration, units, and collection frequency in the Protocols Table.

**Business Rules**Common Rules

1. The combination of (Sample Duration, Unit, Parameter, Method, and Sampling Frequency) must be in PROTOCOLS table.

**Error Messages:**

1. Invalid Protocol.

Insert Rules

1. Method is required.

**Error Messages:**

1. Method is required..

Update Rules

None.

Delete Rules

None.

## 9.11 Blank Type

**Description:**

The blank type describes how the un-exposed filter was handled. It has possible values TRIP and FIELD. A type of TRIP means that the filter was taken to the site, but not placed in the instrument, while a type of FIELD means that the filter was placed in the instrument and removed before operation of the instrument.

**Attributes:**

Alphanumeric  
5 character code  
Mandatory  
Key Field

**Coding Instructions:** Place either TRIP or FIELD in the eleventh delimited field on the transaction as appropriate for the value.

**Business Rules:**Common Rules

1. Blank Type is required.

**Error Messages:**

1. Blank Type is required.
2. Blank Type must be in the BLANK\_TYPES table.  
**Error Messages:**
  1. Invalid Blank Type.
3. Blank Type must be at production status.  
**Error Messages:**
  1. Status for Blank Type is Inactive.
4. The combination of Blank Type, Date, and Time must not already be in database for Monitor.  
**Error Messages:**
  1. Unique constraint violated.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

## 9.12 Date

**Description:** The calendar date for which the observation is being reported.

**Attributes:** Date  
8-digit date  
Mandatory  
Key Field

**Coding Instructions:** Place a valid date in the eleventh delimited field. A date value is valid if it is in the form of YYYYMMDD, it is between 1957 and the current year, and it falls within a valid sample period defined for the monitor.

### Business Rules

#### Common Rules

1. Date is required.

**Error Messages:**

1. Date is required.

2. Date must be in a year greater or equal to the earliest supported year

**Error Messages:**

1. The sample date is not within an available year

3. Date must be less than, or equal to, the system date.

**Error Messages:**

1. Date must be less than current date.

4. Date must fall within a valid sample period for the monitor.

**Error Messages:**

1. Monitor inactive for this date.

5. Date must fall within a valid monitor type assignment period for the monitor .

**Error Messages:**

1. Attempt to add data for which there is no corresponding Monitor Type Date Range

6. If Parameter is a criteria pollutant, Date must fall within a valid reporting organization period for the monitor .

**Error Messages:**

1. No active reporting.agency for this date.

7. If Parameter is a criteria PM pollutant, Date must fall within a valid required collection frequency period for the monitor..

**Error Messages:**

1. No Required Collection Frequency defined for this monitor-date..

Insert Rules

1. A pre-production raw data value must not already be in the database for the Monitor, Date, and Time.  
**Error Messages:**
  1. Unique constraint (AIRSRAQS.ACA\_ACCDET\_FK) violated.
2. Date and Start Time for the sample may not fall within the duration period of the sample immediately preceding it, not span into the duration period of the sample immediately succeeding it..  
**Error Messages:**
  1. Sample duration overlaps immediately preceding or succeeding sample value.

Update Rules

1. A production raw data value must be in the database for the Monitor, Date, and Time.  
**Error Messages:**
  1. Production record doesn't exist to update or delete.

Delete Rules

1. A production raw data value must be in the database for the Monitor, Date, and Time.  
**Error Messages:**
  1. Production record doesn't exist to update or delete..

## 9.13 Time

**Description:** Indicates the beginning of the sampling period in standard time at the location of the monitoring site.

**Attributes:** Alphanumeric  
5 characters  
Mandatory

**Coding Instructions:** Place a valid start time in the twelfth delimited field. A start time value is valid if it is in the format of HH:MM, and does not overlap another sampling period for the monitor.

### Business Rules

Common Rules

1. Start Time is required..  
**Error Messages:**
  1. Start Time is required..
2. Start time must be in the format: HH:MM..  
**Error Messages:**
  1. Invalid time format.

Insert Rules

1. A pre-production raw data value must not already be in the database for the Monitor, Date, and Time.  
**Error Messages:**
  1. Unique constraint violated.
2. Date and Start Time for the sample may not fall within the duration period of the sample immediately preceding it, not span into the duration period of the sample immediately succeeding it..  
**Error Messages:**
  1. Sample duration overlaps immediately preceding or succeeding sample value

Update Rules

1. A production raw data value must be in the database for the Monitor, Date, and Time.  
**Error Messages:**
  1. Production record doesn't exist to update or delete.

Delete Rules

1. A production raw data value must be in the database for the Monitor, Date, and Time.  
**Error Messages:**
  1. Production record doesn't exist to update or delete..

## 9.14 Blank Value

**Description:** The Blank Value is the measured value of the parameter in the un-exposed filter.

**Attributes:** Numeric.  
20 digits with up to 10 digits either before or after the decimal point.  
Required for inserts and updates.

**Coding Instructions:** Place the blank value in the 14<sup>th</sup> delimited field on the transaction. Note: Trailing zeros after the decimal point are preserved as significant figures. (E.g. .100 is marked as having a scale of 3.)

**Business Rules:**Common Rules

1. Blank Value must be a number with no more than 5 digits either before or after the decimal point.  
**Error Messages:**
  1. Invalid numeric format.

Insert Rules

1. Blank Value is required.  
**Error Messages:**
  1. Blank Value is required.

Update Rules

1. Blank Value is required.

**Error Messages:**

1. Blank Value is required.

Delete Rules

None.